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Depression trajectories of older adults in the transition to widowhood

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Depression trajectories of older adults in the transition to widowhood

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The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this dissertation. The Graduate College will ensure this dissertation is globally accessible and will not permit alterations after a degree is conferred.

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ABSTRACT

As a significant life event and a turning point in the life course, losing a spouse to death is one of the most stressful experiences that requires the most intense readjustment in life. The immediate psychological effects of spousal death are usually severe, and there might be a significant increase in depression level right after the death of the spouse. For most people, psychological distress usually resolves over time. For a small number of widowed adults, however, the impact of widowhood on emotional health and depression levels might last for years.

Unlike most studies that use cross-sectional data to investigate the level of depression at a specific time point after the loss of a spouse, this study uses longitudinal data from the Health and Retirement Study to investigate the heterogeneity in the changes in depression level of widowed older adults (n = 446) over eight years before and after the death of a spouse. Continuously married adults (n = 1,611) were also included in the analysis as a comparison group.

The study first compared the differences in characteristics at baseline and depression levels at four waves between widowed and continuously married adults using the χ^2 test for independence and t-test. Then, paired-samples t-tests were conducted to compare five key continuous variables at baseline and immediate wave after for both widowed and continuously married adults. Next, a latent class growth analysis was conducted to identify possible depression trajectories of adults in both widowed and continuously married groups. I then compared differences across four trajectory groups for both widowed and continuously married adults. Finally, sequential multinomial logistic regressions were computed to identify demographic

variables and contextual factors that differentiate respondents in distinct depression trajectory groups.

The comparison between widowed adults and continuously married adults shows distinct group differences. Compared to continuously married adults, widowed adults were more likely to be older, female, non-White, and with lower socioeconomic status and worse health conditions. Furthermore, the widowed adults were less close with their spouse at baseline, and they reported lower scores on positive and higher scores on negative social support from various resources.

The findings support the hypothesis that heterogeneity exists in the adjustments to the death of a spouse. Four groups of adults with distinct depression trajectories in widowhood were identified: “No Depression Group,” “Increasing Depression Group,” “Decreasing Depression Group,” and “Chronic Depression Group.” Except for education level, all the other demographic variables did not differentiate widowed adults from different depression trajectories. Furthermore, the findings show that health status, functional limitations, and negative social support could significantly differentiate widowed adults from distinct depression trajectories. The findings of this study deepen the understanding of distinct depression trajectories in the transition to widowhood and the effects of demographic variables and contextual factors on these depression trajectories. The findings are also of great significance for early professional intervention for adults experiencing increasing and chronic depression after the death of a spouse. In addition, to improve the quality of emotional support and avoid relationship strain, support for widowed adults should also focus on improving self-care and health promotion. This is especially essential for those who are initially in poor health and hence are most vulnerable to long-term and intense psychological distress.

CHAPTER 1
INTRODUCTION

The loss of a spouse is a common experience for married couples, especially for the older ones. Although the percentage of older men and women who were widowed decreased significantly in the past century, 28.6% of older adults (aged 65 and over) now living in the United States are widowed (U.S. Census Bureau, 2014). The percentage of widowed adults increases as people are getting older, and the chance of being widowed for women is much higher than it is for men. For people aged 65 to 74, the percentages of being widowed for men and women are 6.4% and 24.0%, respectively; for people older than 74, the percentages of being widowed for men and women are 21.2% and 56.9%, respectively (U.S. Census Bureau, 2014).

Losing a spouse to death is a significant life event and a turning point in the life course. The bereaved adults not only lost the long-standing companionship and an important social role as a husband or a wife, but usually also need to make major and stressful lifestyle modifications and financial adjustments (King et al., 2018). Hence, widowhood is both a developmental transition that most individuals may experience and a social-psychological transition that is often devastating and stressful.

Spousal bereavement has been found to be associated with a higher chance of developing mental disorders and psychological impairment (Cole & Dendukuri, 2003; Schaan, 2013; Shor et al., 2012; Umberson et al., 1992; Williams & Umberson, 2004). Studies have shown that about one-third of widowed adults developed depressive symptoms in the year they lost their spouse (Jacobs et al., 1989; Zisook et al., 1990). As a global public health concern, depression is a known risk factor of premature death (Blazer, 2003; Mojtabai & Olfson, 2004) and an indicator of poor prognoses of many chronic diseases, such as diabetes, stroke, and heart diseases (Cole & Dendukuri, 2003; Stroebe et al., 2007; Wells & Burnam, 1991).

Many studies on depression in widowhood have been conducted in the past several decades, and there is growing consensus among researchers that widowhood does not have a universal effect on depression (Bonanno et al., 2004; Wolff & Wortman, 2005). Significant individual differences exist in the intensity and duration of psychological distress following the death of a loved one. In terms of how depression levels change in widowhood, some scholars believe that it follows a crisis pattern (Schaan, 2013). Depression levels peak in the early days or weeks after the spouse's death, then gradually decrease, and may eventually fall back to pre-loss levels months or years later. However, this crisis pattern of depression change only represents one pattern of changes in depression in widowhood, and it is not universal. Due to the heterogeneity in the widowed population, there is more than one pattern of change in depression after the spousal loss. A few recent studies have found several distinct depression trajectories prior to and after the death of the spouse (Galatzer-Levy & Bonanno, 2012; Lotterman et al., 2014; Maccallum et al., 2015). However, there is a lack of understanding of the factors affecting these different trajectories. What factors might lead individuals to follow one depression trajectory rather than another? Do the same factors have different effects on people with different depression trajectories? As the research is still in its infancy, there are currently no definite answers to these questions.

With the increasing aging population and the high prevalence of depression in widowhood, it is of particular significance to deepen the knowledge of the effects of widowhood on depression over time and to examine how the effects vary across different socio-demographic groups and under different circumstances. In this study, I used the data from the Health and Retirement Study (HRS) to explore the possible trajectories of depression in the transition to widowhood. I then examined the effects of socio-demographic variables on the membership of

various trajectories. Finally, I analyzed how the depression trajectories were affected by pre-loss contextual factors such as physical health and function limitations, religious attendance, and positive and negative social support from various sources.

CHAPTER 2
LITERATURE REVIEW

This chapter is a review of relevant theories and findings from previous studies. Three theoretical frameworks, life course perspective, stress theories, and set-point theory, are used to guide the current study and will be first summarized. I will then review studies focusing on patterns of psychological outcomes and distinctive trajectories of depression in widowhood. Next, I will discuss the socio-demographic differences in depression in widowhood and then review existing studies on how contextual factors affect the psychological adjustment following widowhood. Finally, I will discuss the limitations of previous studies and how the current study addresses some of the limitations.

Life Course Perspective

The life course is marked by milestones and transitions. As a major life event, like marriage and retirement, widowhood catapults individuals into a new status, widowed adults. Being widowed has been viewed as a critical life transition that may lead to tremendous life changes and may have a major impact on subsequent development (Wortman & Silver, 1990). As an important framework that emphasizes the critical role of time, timing, and social context in human development and family life (Bengtson & Allen, 1993), the life course perspective can provide significant insight into bereavement studies. In the following section, I will first review the principle of timing and the principle of linked lives, two core principles of the life course perspective that are especially relevant for the current study, and then discuss a pair of inherently interrelated concepts—transitions and trajectories.

The Principle of Timing

According to the life course perspective, when a life event occurs is as important as whether this event occurs (Hultsch & Plemons, 1979), because the timing of life events may affect the meaning, consequences, and implications of the events (George, 2013). In widowhood research, there are mainly three reasons that the principle of timing is important and relevant. First, the timing of an event affects an individual's expectedness towards the event. Neugarten (1968) introduced the concept of "on-time" and "off-time" to describe the occurrence of critical life events and transitions at different points in the life cycle. Compared to losing a spouse in later life, the death of a spouse occurring in young or mid-adulthood is an "off-time" or unexpected life event and may lead to more intense responses (Moss et al., 2001). Second, the timing of a life event also has an impact on the resources that could be used to cope with the challenges raised by the event. For example, for widowed older adults, children could serve as the primary source of social support, whereas for younger widows and widowers, children are more likely to be a responsibility (Wortman & Silver, 1990). Besides, older adults may experience a decline in physical strength and cognitive function, which may make the adjustment to widowhood in later life more difficult. Third, certain critical life events often signify notable role changes. Therefore, the timing of a life event may affect the length of an individual staying in a new role (George, 1993). The time one stays in a new role may either help master the challenges associated with the role transition due to longer adjustment or lead to more negative outcomes due to the proliferation of the stresses associated with the new role.

The Principle of Linked Lives

The life course perspective emphasizes the notion that humans are connected to others in complex ways. One's life is shaped by others through the interdependence created by human

relationships (George, 2013). Marriage and the dissolution of marriage exemplify the importance of linked lives. There are three main reasons that this principle is relevant in widowhood studies. First, this principle helps differentiate the variances of sources for the impact of widowhood on health. A married couple shares a common living environment and even similar lifestyles, which may foster either healthy or unhealthy habits throughout the marriage (Pienta & Franks, 2005). Hence, there might be two explanations for the deleterious effect of widowhood on health. One explanation is that the declining health may be due to the loss of the spouse itself and the severance of the deep attachment. Another explanation is that poor health may be due to shared lifestyles and common social and physical environments that, in some way, lead to the death of the deceased spouse. Second, the principle of linked lives highlights the attention on how pre-loss marital quality affects the outcomes of the spousal loss. For example, controlling for a myriad of other variables, the effects of spousal death might be contingent on how intimate the relationships between the couple was (Carr, 2004). It is expected that the more interdependent the spouses, the more difficult it is to adjust to the death of the spouse. Third, the principle also emphasizes the importance of social support and interpersonal relationships on the adjustment in the transition to widowhood. Both instrumental and emotional support from others after spousal loss may help widowed individuals better master the challenge and buffer them from the harmful effects of the bereavement (Wolff & Wortman, 2005).

Transitions and Trajectories

The life course perspective views an individual's biography from a longer time frame, typically ten years or longer (George, 1999). In this long-range view of one's life course, two concepts become central: transitions and trajectories (George, 1993). Transitions refer to changes in social roles and changes between statuses that are dispersed over time and space, although the

consequences of these changes may not be observed after the transitions take place. Transitions are naturally connected with life events and hence naturally interrelated with trajectories (George, 1999). Trajectories refer to long-term patterns of stability and variability, usually involving multiple transitions that are always embedded in trajectories and make a trajectory distinctive from the others. Differences among trajectories should be distinct, and various trajectories should be reliably distinguished from each other. For example, trajectories of one's work and life are delineated by the order and sequencing of the role entrance and exit. Besides, the characteristics of the trajectories include not only the sequence of role transitions but also the duration between the transitions of each role (George, 1999).

Stress Theories

Losing a spouse to death is one of the most stressful experiences that requires the most intense readjustment in life (Dohrenwend et al., 1978; Holmes & Rahe, 1967). The losses associated with the death of a spouse usually challenge and tax coping resources of the bereaved and take a toll on their physical and mental health. Besides, the effect of spousal bereavement might be different for individuals from different social groups. In the next section, I review stress theories highlighting two aspects: (1) stress proliferation theory, and (2) differential stress exposure and vulnerability hypotheses. The advantage of applying stress theories in the current study is that these theories effectively incorporate the study of conjugal bereavement into a line of research that has linked stressful events to various health outcomes.

Stress Proliferation

Pearlin and colleagues use the term "stress proliferation" to illustrate the propensity for stressors to multiply (Pearlin et al., 1997; Pearlin et al., 2005). Stress is proliferated when the original stressor, the so-called "primary stressor," leads to a secondary stressor. Primary stressors

refer to stress-arousing demands that are directly rooted in a challenging situation. Secondary stressors, in contrast, are defined as stressful experiences that resulted from primary stressors. Both primary and secondary stressors operate cumulatively and can exert harmful effects on one's health and well-being. According to this theory, stress proliferation is more likely to take place when there are decisive role and status changes during a major life transition, or when the critical life transitions are off time (Pearlin et al., 2005).

Losing a spouse causes the severance of a close attachment, an experience that is stressful and challenging in itself (Holmes & Rahe, 1967). It may also cause other undesirable events and chronic strains, such as financial difficulties, the burden of household work, and involuntary relocation of residence (Sasson & Umberson, 2014). Among all the secondary stressors that are triggered by the spouse's death, continuous and repeated economic strains and hardships represent the most deleterious ones. Compared with temporal and episodic economic difficulties, ongoing and unbroken financial stresses exert a greater damaging effect on the health and well-being of individuals (Pearlin et al., 2005).

Stress Exposure and Vulnerability

Individuals from different social groups have differential stress exposure and susceptibility (Adler & Matthews, 1994; George & Lynch, 2003; Matthews et al., 2010; Turner & Avison, 2003). According to the differential exposure and vulnerability hypotheses, the mechanism linking stressful life events and declining physical and mental health lies in the frequency and intensity of stress exposure and related emotional and physiological responses (Kessler, 1979). As noted above, losing a spouse not only is a major life disruption that may cause acute stress but also often leads to chronic strains from economic difficulties and adjustments to manage the household. Both acute stresses and chronic strains challenge the

coping capacities of widowed adults (Stroebe & Stroebe, 1987). Widowed older adults at disadvantaged social positions usually have a limited bank of resources and are likely to be exposed to more adverse events and daily hassles. The stress exposure will not only lead to more emotional distress but also influence their perceptions towards ambiguous or neutral events and interpret the events as stressful (Matthews et al., 2010). The perceived and real stress exposures tend to deplete the already limited resource reservoir of widowed adults and prevent the accumulation and replenishment of resources to be stored. Taken together, the limited reserve capacity of the resources of some adults may make widowhood more stressful and may lead to elevated and prolonged emotional responses.

Set-Point Theory

According to set-point theory, although individuals have different levels of subjective well-being, they typically maintain a balanced and relatively stable level in their whole life (Lykken & Tellegen, 1996). The balance and stability may be briefly interrupted after experiencing major life events, no matter positive or negative, but the interruptions are usually temporary and do not have a long-term, lasting effect on an individual's subjective well-being. Individuals will adapt to the new situation, and their subjective well-being usually returns to the baseline. Set-point theory is commonly applied in research of subjective well-being (Headey, 2010; Luhmann & Intelisano, 2018), but it might not be suitable to guide the study of psychological distresses such as depression in widowhood. Many widowhood studies have found significant individual differences in the intensity and duration of psychological distress following the death of a loved one (Galatzer-Levy & Bonanno, 2012; Lotterman et al., 2014; Maccallum et al., 2015; Wolff & Wortman, 2005). The immediate psychological effects of spousal death are usually sharp, and there might be significant psychological interference right after the

bereavement. For most people, these psychological problems usually resolve over time. However, for adults who experienced chronic grief, the impact of widowhood on emotional health will continue and may last a long time. Hence, whereas set-point theory might apply to the majority of widowed adults in this study, it might not explain other depression trajectories of some adults in their transition to widowhood. Therefore, I explored all the possible depression trajectories before and after the death of the spouse using the latent class growth analysis in this study.

In the following sections, I will first discuss the heterogeneity in bereavement responses identified in depression trajectories and then review how demographic variables and other contextual factors might affect depression levels in the transition to widowhood (see Table 1).

Table 1

Topics Reviewed in the Following Sections

Heterogeneity in Bereavement Responses	Demographic Variables	Contextual Factors
Patterns of bereavement responses	Gender	Mode of death
Depression Trajectories	Age	Pre-loss relationship
The course of depression	Ethnicity	Caregiver status
Heterogeneity in depression trajectories	Socioeconomic status	Religiosity
		Social interactions
		Physical health

Patterns of Bereavement Responses

The reactions to conjugal loss and the ensuing adaptations in widowhood differ significantly across individuals. Many recent studies, especially longitudinal studies, have documented and highlighted the marked heterogeneity in the experiences and health consequences of spousal bereavement (Bonanno et al., 2004; Maccallum et al., 2015; Wolff & Wortman, 2005). Whereas some widowed adults experience ongoing and debilitating distress,

others experience symptoms that abate over time or with little disruption in functioning (Bonanno et al., 2004; Wolff & Wortman, 2005).

Bonanno et al. (2004) summarized three patterns of outcomes following widowhood based on existing bereavement studies. The first pattern is a common but brief disruption of daily functioning, such as increased depressive symptoms, cognitive disorganization, and a few health problems. The interruption usually lasts several months to one or two years. The second pattern is chronic disruptions of daily living with impaired physical and mental functioning. The disruptions last over two years or even longer. The last one is characterized by no or few disruptions and symptoms of depression.

Depression Trajectories

The Course of Depression

The negative effects of widowhood are particularly severe in the first two years after the loss of a spouse (Harlow et al., 1991; Jadhav & Weir, 2018; Mendes de Leon et al., 1994). Schaan (2013) suggested that the course of psychological distress in widowhood follows a crisis pattern: psychological distress immediately after the death of the spouse is the strongest, but the extent of the distress will weaken with time. Some studies showed that the depression levels for most widowed adults fall back to pre-loss levels after several years (Harlow et al., 1991; Mendes de Leon et al., 1994), whereas other studies found that the levels of depression are still higher than the levels prior to the spouse's death, although the levels did decrease over time (Lee et al., 2001; Lee et al., 1998).

Heterogeneity in Depression Trajectories

Even though depression as one of the most common psychological outcomes of bereavement has been extensively studied, the heterogeneity in the changes of depression in

widowhood remains understudied. Using a nationally representative sample of older adults in the United States, Bonanno et al. (2002) categorized high and low pre-loss depression scores using the 80th percentile as a cutoff for high depression, then calculated change scores from pre-loss to 6- and 18-months post-loss for each participant, and finally defined five distinct trajectories of depression before and after the conjugal loss. However, the basic categorization procedures used in the study may prevent this study from fully capturing the population heterogeneity. Hence, Bonanno and colleagues in recent years used latent growth mixture modeling (LGMM) to examine the heterogeneity in the depression of bereavement (Galatzer-Levy & Bonanno, 2012; Lotterman et al., 2014; Maccallum et al., 2015). These studies typically found four discrete depression trajectories following bereavement: *Resilience*, characterized by little or no depression before and after the loss, *Chronic Grief*, characterized by lengthy and slowly alleviated depression following the loss, *Depressed-Improved*, characterized by a decrease from high pre-loss depression, *and Pre-Existing Chronic Depression*, characterized by ongoing high depression at all time points examined. In this study, I will examine the heterogeneity of depression trajectories in the transition to widowhood and compare the results with existing findings. I will then investigate how widowed adults with different depression trajectories differ in socio-demographic characteristics and pre-loss contextual factors.

Social Group Differences in Depression Following Widowhood

Gender

Due to gender differences in social roles and the mediating and moderating factors in the psychological adjustment to a spouse's loss, bereavement researchers have long believed that widows and widowers experience bereavement in different ways (Carr, 2004; Inaba et al., 2005; Lee & DeMaris, 2007; Lee et al., 1998; Sasson & Umberson, 2014; Stroebe et al., 2001;

Umberson et al., 1992). However, even though there is a great body of research on gender differences in outcomes following widowhood, the evidence has been inconclusive. Although more studies have shown that widowhood typically affects men more negatively (Bennett et al., 2005; Carr, 2004; Jadhav & Weir, 2018; Lee et al., 1998; Perrig-Chiello et al., 2016; Umberson et al., 1992; Williams, 2003), some other studies showed that women were more depressed (Chou & Chi, 2000; Liechtenstein et al., 1996; Thompson et al., 1989) or there were no significant gender differences on psychological distress (Sasson & Umberson, 2014; Schaan, 2013).

There are at least two reasons for the inconsistent results. First, it is more likely to find that widowhood has a more pronounced effect on men than on women in cross-sectional studies. This is because women, in general, report a longer duration of widowhood, and psychological distress of losing a spouse usually abates over time and may eventually fall back to pre-loss levels several years after the loss. Hence, in a cross-sectional study, men and women are likely at different stages of widowhood. If the widowhood duration in cross-sectional studies was not controlled, it is likely that the observed differences in distress levels were due to differences between short-term and long-term effects of widowhood, rather than to gender differences (Sasson & Umberson, 2014). Second, widowhood may affect men and women differently. Women are more likely to experience financial difficulties in widowhood (Lee et al., 1998; Umberson et al., 1992), and chronic financial strain has been found as a risk factor for psychological distress (Pearlin et al., 2005). In contrast, men are more likely to have difficulties managing household tasks that were previously performed by their wives (King et al., 2018; Lee et al., 2001; Umberson et al., 1992).

Age

In terms of age differences in depression, there has been disagreement among researchers. On the one hand, there is evidence that spousal bereavement is less of a coping challenge for older adults because the death of a spouse is a more common and expected event for individuals in later life than for individuals in their young or middle adulthood years (Wortman & Silver, 1990). Many older adults may expect that they will have to face the death of their spouse and may have prepared accordingly for this challenge (Wolff & Wortman, 2005). Besides, older adults are more likely to lose their spouse due to chronic diseases, and hence they have more opportunities to resolve unfinished matters (Keene & Prokos, 2008). Compared to those who lost their spouse at a younger age, older people also have more opportunities to learn from their widowed peers on how to cope with spousal bereavement (Wolff & Wortman, 2005). Finally, older adults, in general, are more accepting and less emotionally reactive to stressful events (Moss et al., 2001). Older people are more likely to address loss-related regrets than younger people, an advantage associated with better adaptation to loss (Torges et al., 2008). Although aging is accompanied by losses in many aspects of life, older adults also gain wisdom-related knowledge (Baltes & Baltes, 1990) to master stressful and challenging events such as the death of a spouse.

However, other researchers believe that the death of a spouse is more difficult to cope with and adjust to for older adults than for younger people, especially in the long run (Wolff & Wortman, 2005). There are several reasons to support this argument. First, older couples may have spent many years together before death finally separated them. Many older widows and widowers have developed long and deep connections and attachments towards their deceased spouse (Moss et al., 2001), and hence the severance of this life-long relationship may be

especially devastating and challenging to adjust to (Stroebe & Stroebe, 1987). Second, many older adults have experienced other role losses due to certain major life changes, such as retirement, prior to the loss of a spouse. The cumulative role losses at this stage of life may further decrease the social identity and self-identity of widowed older adults and cause feelings of uselessness and futility (Stroebe & Stroebe, 1987). Finally, it is more common for older adults to experience certain stressful life events, such as having chronic diseases, being disabled, or experiencing involuntary relocation. At the same time, older adults are more likely to experience financial difficulties and the deterioration in physical and cognitive function (Wolff & Wortman, 2005). Besides, compared with their younger counterparts, widowed older adults, in general, have fewer social relationships, and they are less likely to build a new deep relationship through remarriage (Wolff & Wortman, 2005). The reduction in adjustment resources makes it more difficult for widowed older adults to cope with challenging life events in widowhood.

Ethnicity

Although there has been extensive research on ethnic differences in mental health, most studies in the United States have focused on Black-White differences, with Latinos and other ethnic groups typically underrepresented in studies. So far, the pattern of findings on ethnic differences in depression has been somewhat inconclusive. One reason for the inconsistent findings might lie in the distinctions between depressive symptoms and depression disorders (George & Lynch, 2003). In terms of depressive symptoms, most studies have observed a larger number of symptoms in African Americans than in Caucasians (Fernandez et al., 1998; Jackson, 1997; Kessler, 1979; Myers et al., 2002). In studies of depressive disorders, however, studies showed either that African Americans are at a lower risk of having depression disorders than Caucasians or that there are no significant differences (Kessler et al., 1999; Oquendo et al.,

2001). Ethnic differences in the prevalence of depression may also depend on the type of depression. For example, Riolo et al. (2005) found that African Americans and Latinos have higher lifetime prevalence rates of dysthymic disorder, whereas Caucasians have higher lifetime prevalence rates of major depressive disorders.

Some studies showed that ethnic differences in depression disappeared after controlling for SES variables (Fernandez et al., 1998). Other studies showed that the relationship between ethnicity and depression varies among individuals with different levels of SES (Kessler & Neighbors, 1986). Aside from SES, the ethnic differences in depression might lie in differences in stress exposure and vulnerability. Some studies have shown that minorities are, in general, exposed to greater stressors and react more to these stressors (George & Lynch, 2003). Other studies showed that ethnic differences in stress vulnerabilities might depend on the type of stressors. Caucasians are more vulnerable to depression than African Americans when exposed to chronic economic difficulties, whereas African Americans are more vulnerable when confronting undesirable life events (Ulbrich et al., 1989).

There is a dearth of studies focusing on ethnic differences in bereavement outcomes. Elwert and Christakis (2006) found that widowhood effects depended on the ethnicity of each spouse. The study found a larger and more enduring widowhood effect among White couples but not among Black couples. For interracial marriages, the size and presence of the widowhood effect depended entirely on the wife's ethnicity, regardless of the husband's own ethnicity.

Socioeconomic Status

In the general population, higher socioeconomic status (SES) has been consistently found as a protective factor of physical health and mental well-being (Adler et al., 1994; Adler & Ostrove, 1998; Berkman, 2009; Cohen et al., 2010; Lorant et al., 2003). A higher level of

education is usually associated with a better-paid job and larger or more supportive social networks (Mirowsky & Ross, 2003), which are beneficial to health. Higher-income and wealth are inversely related to risks of disease and premature death. Those with more wealth may be better able to afford medical costs and caretaking assistance for themselves and their spouses. In contrast, low SES individuals are more likely to develop persistent depression symptoms (Lorant et al., 2003), consistent with the characteristics of stressors related to low income, including chronic financial difficulties and exposure to unsafe and unstable environments (Fiske et al., 2009).

Even so, whether higher SES is protective of health and well-being in widowhood is still inconclusive. From the perspective of differential stress exposure and vulnerability, individuals with lower SES have greater exposure to stressful and undesirable life events, and they are also at higher risk of the deleterious effects of these events due to limited resources (Kessler, 1979; Matthews et al., 2010). Some studies did show that the SES health gradient still holds in widowed adults (Sasson & Umberson, 2014; Sullivan & Fenelon, 2014), but it remains unclear whether the effect of bereavement on mental health is simply additive to the effect of SES or is contingent on the level of SES.

However, other studies suggested that high SES may not be protective in widowhood. A few studies showed that high-SES individuals are more vulnerable to depression from losing a spouse to death than those with lower SES (Bowling, 1987; Manor & Eisenbach, 2003; Martikainen & Valkonen, 1996; Wortman et al., 1993).

In sum, among all the socio-demographic variables mentioned above, only gender and age have been extensively studied. However, very limited research has investigated the effects of gender, age, and other variables in differentiating adults with different depression trajectories in

the transition to widowhood. In this study, I will examine the relationships among these variables and distinct depression trajectories.

Other Contextual Factors

Mode of death

Whether the death of a partner occurs suddenly or is a result of chronic diseases may have a significant impact on one's adjustment to bereavement. Existing studies typically found that it caused more intense responses to the surviving spouse, and it took longer to recover from the shock if the death of the spouse was sudden and less expected (Sasson & Umberson, 2014). Some researchers have suggested that the effects of the mode of death on the consequences of widowhood may depend on gender. For example, Sullivan and Fenelon (2014) found that the sudden death of a spouse has a more negative effect on men than on women.

It should be noted that the mode of death may be confounded by the age of the deceased spouse. Compared with premature death, death in later life is more likely to result from chronic diseases, which provides an opportunity for the couple to resolve unfinished matters (Keene & Prokos, 2008). On the other hand, if the spouse's death is sudden or due to an unnatural cause, it may have a more severe impact on the surviving spouse (Sasson & Umberson, 2014).

Pre-Loss Relationship

The quality of marriage before widowhood may also affect the adaptation in the transition to widowhood. Although some clinical psychologist linked chronic grief to marital conflict (Rando, 1993), other studies have found that those with the happiest marriages are more likely to experience intense and lasting grief following widowhood (Carr & Boerner, 2009; Carr et al., 2000). There are also studies showing no significant relationship between the quality of marriage and adaptation in widowhood (Lund et al., 1993). One of the reasons for the

inconsistent findings may be that it is difficult for an individual to accurately evaluate his or her marriage after the spouse's death because the bereaved tend to idealize or sanctify the deceased spouse (Futterman et al., 1990). In addition, individuals who experience more severe distress after widowhood may evaluate marriage as having been more conflicted than the actual situation (Bonanno et al., 1998).

Another widely accepted hypothesis is that chronic grief is associated with over-dependence on the deceased spouse. Existing studies do suggest that high interdependence on each other is a risk factor for poorer consequences after widowhood (Bonanno et al., 2002; Carr et al., 2000). However, there are also studies showing that women who rely most on their partners emotionally may receive more benefits after the partner's death (Carr, 2004). Similarly, men who rely heavily on their spouses for housekeeping and financial management also experienced significant growth after the death of their spouses. According to Carr (2004), these results suggested that individuals who had been heavily dependent on their spouse received more psychological rewards by finally mastering the tasks that used to be performed by the deceased spouse.

Caregiver Status

Providing care for a sick partner or a partner with disabilities prior to bereavement may also have an impact on depression levels in widowhood. On the one hand, because care work is demanding and stressful, the death of a partner, though heartbreaking, may also represent relief for the surviving partner (Keene & Prokos, 2008; Prokos & Keene, 2005). As a result, a partner who used to be a caregiver may benefit from the death of a terminally ill partner, as reflected in improved physical and mental health, as well as higher social participation. On the other hand, bereaved persons who have taken care of a deceased partner for a longer period are more likely to experience a decline in physical and mental health due to stressful care work (Carr & Utz,

2001; Kaufman et al., 2018; Pinquart & Sörensen, 2003; Vitaliano et al., 2003). Therefore, it is critical to distinguish whether the higher level of depression following widowhood is a reaction to bereavement or comes from chronic depression before widowhood. Whether the caregiver is more likely to be depressed may be affected by restriction of the caregiver's ordinary activities (Williamson & Shaffer, 2002), and the extent of the restriction is related to the type of disease of the care recipient. Studies have shown that people who have taken care of people with dementia have a higher risk of depression than those who have taken care of people with physical disabilities (Pinquart & Sörensen, 2003). Besides, the severity of behavioral problems and psychological distress of care recipients may also affect the caregivers' depression level (Schulz et al., 2008).

Religiosity

Religious belief is an important supporting force for many people facing loss-related life events (Park & Folkman, 1997). In the face of a stressful event such as the death of a partner, it is expected that religious beliefs will also have an impact on the outcomes of bereavement (Stroebe & Stroebe, 1987). However, there are only a few empirical studies on the relationship between religiosity or religious participation and the adjustment in widowhood, and hence the relationship is less clear (Michael et al., 2003). Some studies found that widowed adults were more likely than their non-widowed counterparts to increase their religious/spiritual beliefs. This increase was associated with a decline in grief but not with changes in other indicators of adjustment, such as depression (Brown et al., 2004). Other studies found that the frequency of prayer had a negative relationship with well-being (Roff et al., 2007).

However, religiosity is a multifaceted concept. It is not clear from previous studies whether the spiritual or social aspects of religion play a key role. Religion not only provides a

system of beliefs (e.g., faith in life after death) that may comfort the surviving spouse (Brown et al., 2004; Stroebe & Stroebe, 1987) but also provides a religious community and, thereby, a network of social support that protects individuals from the adverse effects of stressful life events (Krause, 2002). Since believers are often well integrated into their religious communities, it is difficult to separate the social aspects of religion from its spiritual aspects (Stroebe & Stroebe, 1987).

Social Interactions

Social support is one of the most commonly studied moderators in bereavement studies. As people age, the number of their social connections is decreasing (Carstensen et al., 1999). Hence, social support might be especially crucial for older adults. A great body of research has shown that a lower level of social support is detrimental to both the physical health and mental well-being of older adults, no matter whether they lost a spouse or not (Cohen, 2004; Cohen & Syme, 1985; Cohen & Wills, 1985; Cutrona & Russell, 1990; Fisher et al., 2014; Kessler et al., 1985). Social support is a complex construct that includes multiple types of assistance (Cutrona & Russell, 1990), such as emotional support, as well as material and instrumental support. Several studies showed that social support could mitigate or exacerbate the impact of spousal bereavement, especially among widowed older adults (de Vries et al., 2014; Silverstein & Bengtson, 1994; Wolff & Wortman, 2005). Aside from studying the potential protective effect of social support, some researchers also suggest to investigate the effect of negative interactions (Cohen, 2004; Wolff & Wortman, 2005). A few studies demonstrated that social interactions with the characteristics of aggression, hostility, and anger could negatively affect older adults' health and well-being (Rook, 1997). For those who are experiencing undesirable life events, negative interactions might be particularly harmful (Rook, 1984). However, how will negative

interactions, or social strains, affect the psychological adjustment in widowhood remains understudied.

Physical Health

Physical health can also affect the level of depression of widowed adults. Overall, the evidence shows that physical health and depression are closely related, but the causal directions remain less clear (Berkman et al., 1986; Musselman et al., 1998). Although some studies have shown that poor health and disability are risk factors for depression (Alpass & Neville, 2003), there are also studies showing that high levels of depressive symptoms lead to the onset of chronic diseases or the exacerbation of existing health issues (Broadhead et al., 1990; Moussavi et al., 2007).

There is very little evidence on the relationship between pre-loss physical health and adjustment to widowhood. Theoretically, it can be expected that poor physical health before widowhood might be a risk factor for depression in widowhood. As reviewed above, the death of a spouse is very stressful and poses a significant challenge to one's coping resources. For individuals with chronic illness or disability prior to the loss, life in widowhood becomes particularly challenging to deal with. In terms of studies on post-loss physical health, there is some evidence showing that physical health and depression following widowhood are interrelated. At least in the short term, many widowed people experience health-related behavioral changes, such as becoming inactive or relying on alcohol and other drugs to avoid the pain of bereavement (Pienta & Franks, 2005). These changes in health behavior may have a temporary or lasting impact on the overall health of the bereaved. In widowhood, the deterioration of health may increase the level of depression, and increased depression, in turn, leads to further compromised health, resulting in a vicious circle.

Two points need to be noted on the relationship between physical health and depression in widowhood. First, both depression and changes in marital status may affect an individual's assessment of his or her health. Studies found that depression increases the perceptions of poor health (Cole & Dendukuri, 2003; Mulsant et al., 1997). Perrig-Chiello et al. (2016) found that widowhood negatively affects one's subjective health. Second, physical health and age are closely related. Compared with young people, older adults usually have relatively poor health and functioning. Therefore, age should be controlled for when examining the relationship between depression and physical health.

In summary, although the contextual factors reviewed above can potentially affect the outcomes and adjustment of widowhood, they have been understudied in widowhood research. Especially, no research has investigated whether these contextual factors may affect depression trajectories of widowed adults. In this study, I will analyze how the depression trajectories will be affected by pre-loss contextual factors, such as physical health and functional limitations, religious attendance, and positive and negative social support from various sources.

Limitations in Previous Studies

In summary, there has been an increasing body of research in the past several decades concerned with psychological adjustment in widowhood. Many studies show that losing a spouse to death is the top risk factor for psychological distress and depression (Cole & Dendukuri, 2003; Schaan, 2013; Umberson et al., 1992; Williams & Umberson, 2004), and that the extent and length of the distress differ greatly across individuals (Bonanno et al., 2004; Wolff & Wortman, 2005). Some recent longitudinal studies have documented and highlighted the marked heterogeneity in depression trajectories in the transition to widowhood (Galatzer-Levy & Bonanno, 2012; Lotterman et al., 2014; Maccallum et al., 2015). Since widowhood is a

multifaceted transition, the variances in psychological outcomes may be explained by many moderating factors. To begin with, by influencing coping resources and the level of stress exposure and vulnerability, social and demographic status, such as gender, ethnicity, and social position, may all play an important role. In addition, the psychological adjustment in widowhood may also be contingent on the timing and mode of a spouse's death, closeness with the spouse, caregiver status, religiosity, social interactions, and physical health.

Although there has been much progress in studies of depression in the transition to widowhood, there are still some critical and unsolved issues in previous studies. First, there is a dearth of empirical studies focusing on the variability in the depression trajectories. Even though theoretical and clinical psychologists have long proposed that there are various psychological responses to the death of a spouse, only very recently have empirical studies been used to validate these propositions. These studies are limited in number, and most of them came from the same research group (Bonanno et al., 2002; Bonanno et al., 2004; Lotterman et al., 2014; Maccallum et al., 2015). Hence, the findings from these studies need to be replicated and complemented.

Second, many existing studies on spousal bereavement fail to include pre-loss information. These studies follow widowed adults only after the loss of the spouse, and hence the circumstances prior to bereavement are unknown or obtained through retrospective self-reports from the surviving spouse. This limitation makes it difficult to accurately evaluate the pre-loss functioning of the surviving spouses and to examine factors that might influence their functioning afterward. Hence, the trajectories or reaction patterns that some studies observed might not be able to explain the full consequences of the bereavement and the whole process of anticipations, reactions, and adaptations.

Third, as pointed out by Maccallum et al. (2015), the respondents in many studies have self-selected to participate in grief research. Besides, many bereavement studies focused on White middle-class persons. This limitation causes bias of the study sample and makes the results difficult to generalize.

Fourth, even though the number of bereavement studies using prospective longitudinal data is increasing in recent years, most of these studies only followed the bereaved for a short period of time (usually one or two years), and hence failed to show the full adaptation in the transition to widowhood.

Finally, not enough attention has been placed on the heterogeneity of bereavement effect on depression. Although gender differences in the outcomes of spousal bereavement have been studied intensively, there are not enough studies on how age, ethnicity, social-economic status, health, and social support affect the consequences of bereavement.

The Present Study

Data from the Health and Retirement Study (HRS) were used to partly address these limitations. The HRS is a nationally representative longitudinal study focusing on multifaced aging experiences of US adults over the age of 50 and their spouses. Data have been restructured to maximize the number of respondents. Respondents in the sample were followed up to eight years (up to two years prior to the loss of a spouse and up to six years after the loss).

A paper from Bonanno's team (Maccallum et al., 2015) also examined the depression trajectories using the same HRS data. However, since the focus of their paper was on the comparison of depression trajectories following spousal and child bereavement, the independent variables in the study were limited to basic demographic variables (i.e., age, gender, education levels, and household income). Whereas their study explored the trajectories of depression

following the loss of a spouse, it did not answer questions such as: (1) What are the effects of widowed adults' health and functional limitations on their depression trajectories? (2) What are the effects of being a caregiver of the deceased spouse on the depression trajectories of the widowed adults? (3) Will widowed adults follow different depression trajectories if their relationship with the deceased spouse is different? (4) Will being close to the deceased spouse predict a resilient trajectory or a maladaptive one? (5) What roles does religious attendance play in the transition to widowhood in changes of depression levels? and (6) What are the effects of social support from various sources on depression trajectories? More importantly, although Maccallum et al. (2015) compared the depression trajectories following spousal and child loss, they did not compare changes in depression levels among a nonbereaved population. Hence, it is not clear whether the trajectories found in a bereaved population apply to a non-bereaved population, or whether the same factors have the same effects among bereaved and non-bereaved populations.

By incorporating a continuously married comparison group and by including more contextual variables at baseline, such as health function of the deceased spouses and the surviving spouse, marital quality, religious attendance, and level of social support, the present study aims to replicate and extend the findings in Maccallum et al. (2015) and to explore the following questions:

1. Are there distinct trajectories of depressive symptoms prior to and after the death of the spouse, as suggested by many previous studies? If the answer is yes, what are these trajectories? How does the level of depression change before and after the spouse's death for widowed adults with varying depression trajectories? Will similar depression trajectories be found among continuously married adults?

Based on the extant literature, I expected to identify distinct depression trajectories prior to and after widowhood. Further, I expected at least four distinct depression trajectories: *No Depression*, characterized by little or no depression prior to the loss, slight and temporary increase in depression after the loss, and relatively quick return to the baseline level over time; *Increasing Depression*, characterized by an immediate increase after the loss and a remaining high level of depression following the loss; *Decreasing Depression*, characterized by a high level of depression before the death of the spouse and a quick decreasing trend following the loss; and *Chronic Depression*, characterized by ongoing high depression at all time points, as in most populations. Regarding the depression trajectories for continuously married adults, I expected to see four or five trajectories, with a chronic high trajectory, an always low-depression trajectory, and two or three fluctuating trajectories.

2. What are the socio-demographic differences among widowed adults with varying depression trajectories? Does the same socio-demographic variable have the same effect on changes in depression levels for widowed adults with different trajectory group memberships?

Since financial difficulties are major sources of stressors in widowhood, and since women, especially minority women, would be more likely to go through financial strains, I hypothesized that they would be more likely to follow either an Increased Depression or a Pre-existing *Chronic Depression* trajectory. I also hypothesized that younger widowed would be more likely to follow the *Increasing Depression* trajectory. Since the protective effect of high SES on health and well-being might still hold, I hypothesized that widowed older adults with high SES would be more likely to follow the *No Depression* trajectory. In addition, I hypothesized that SES would play a particularly important role for widowed adults whose pre-

loss depression level is high. Finally, I hypothesized that low SES would be more likely to classify individuals to unfavorable trajectories in widowed than in the continuously married population.

3. How does the effect of widowhood on the depression trajectories vary across different contextual factors, such as pre-loss health function of the deceased spouses, post-loss health function of the surviving spouse, pre-loss marital quality, religious attendance, and level of social support?

Because physical health is one of the important intrapersonal resources, and since health decline is another major stressor in widowhood, I hypothesized that widowed adults with poor health would be more likely to follow either *Increasing Depression* or *Chronic Depression* trajectories. Closeness with the spouse has also been found as an important factor in the adjustment of the spousal loss, and therefore I hypothesized that those with a close relationship with their deceased spouse would be more likely to follow an Increasing Depression trajectory. On the other hand, I hypothesized that those who attend church more frequently and those who receive a high quality of social support from various sources would be more likely to follow a No Depression trajectory.

CHAPTER 3
METHODS

Data and Participants

The data used in this research are from the Health and Retirement Study (HRS), a nationally representative longitudinal panel study that was conducted by the University of Michigan and supported by the National Institute on Aging (NIA U01AG009740) and the Social Security Administration. HRS surveys US adults over the age of 50 and their spouses (regardless of age) to study changes of the respondents in social, psychological, physical, functional, and cognitive health associated with aging (HRS Staff, 2017). I obtained approval from the Institutional Review Board at Iowa State University to use the HRS data for my dissertation study (Appendix).

Because certain psychosocial variables of interest are not available before wave 7, only data in wave 7 (2004) and following waves of HRS data were used in this study. The response rate for the wave used in the current study is 86.4% and higher (HRS Staff, 2017). To maximize the number of widowed adults in this study, I restructured the HRS data (see Table 2) so that depressive symptoms of the respondents can be examined based on time prior to and after the loss of the spouse, rather than based on each wave.

To be selected, the respondents had to be married at the base wave and widowed in the following wave, had depression scores at base wave and post wave 1; had no more than one missing depression score in all four waves, and had responded to the HRS “left-behind” survey. This left a sample size of 446 widowed adults (Figure 1). I also selected respondents who remained married to compare their depression trajectories with the trajectories of widowed older adults.

Table 2

The Composition of Waves for each Study Cohort After Restructuring HRS Data

	Wave 7 (2004)	Wave 8 (2006)	Wave 9 (2008)	Wave 10 (2010)	Wave 11 (2012)	Wave 12 (2014)	Wave 13 (2016)
Cohort 1	**Base wave**	Post wave 1	Post wave 2	Post wave 3			
Cohort 2		**Base wave**	Post wave 1	Post wave 2	Post wave 3		
Cohort 3			**Base wave**	Post wave 1	Post wave 2	Post wave 3	
Cohort 4				**Base wave**	Post wave 1	Post wave 2	Post wave 3

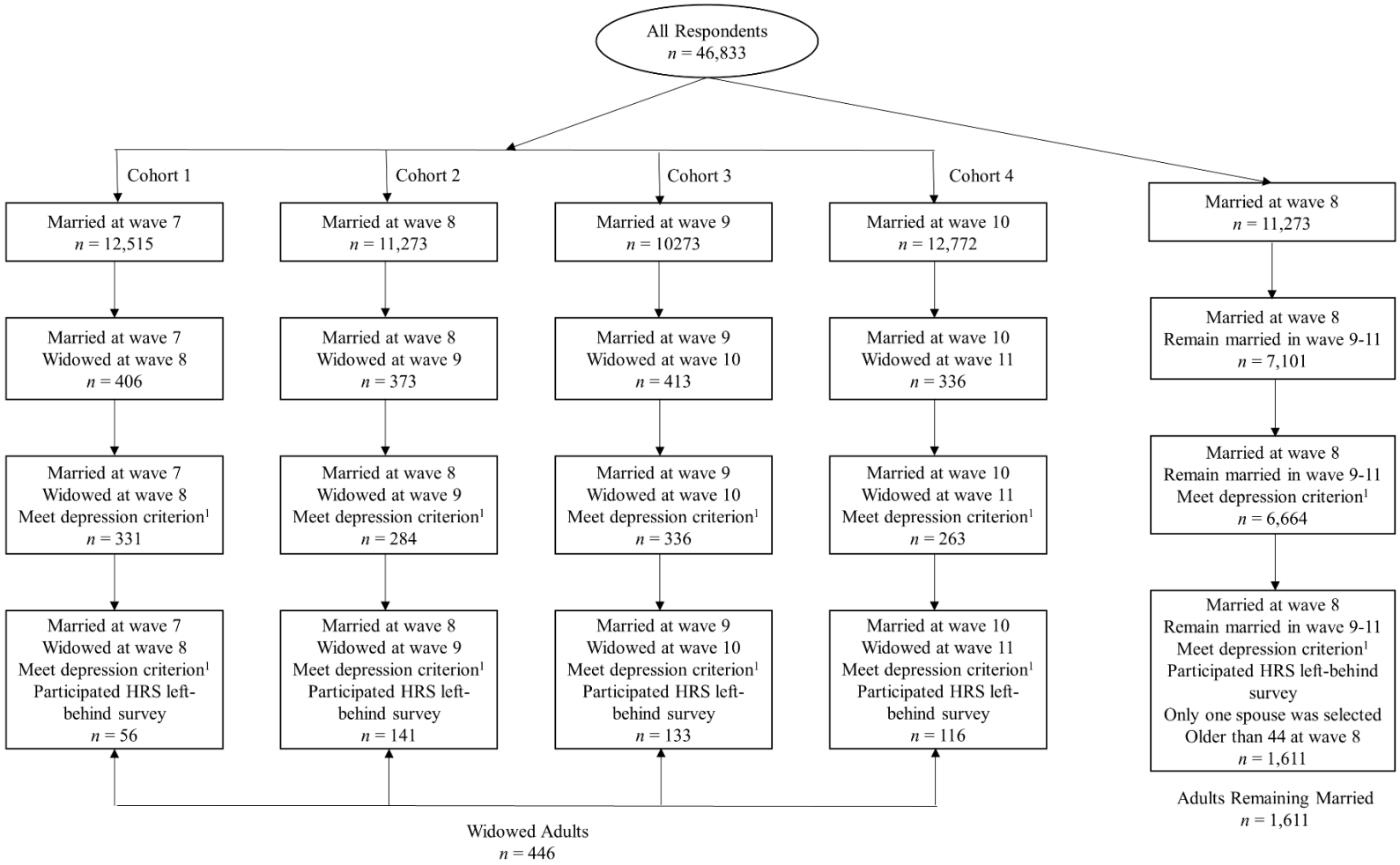

Figure 1. The Number of Cases Meeting Different Combination of Case Selection Criteria for Widowed Adults (n = 446) and Continuously Married Adults (n = 1611).

Note. Depression criterion = having a depression score in base wave and post wave 1; no more than one missing depression score in all four waves. HRS = Health and Retirement Study.

The respondents in the remaining married group were married at wave 8 and stayed married during the following three waves, had data on depression at wave 8 and wave 9, had no more than one missing depression score in all four waves, had responded to the HRS "left-behind" survey, and were older than 44 years at wave 8. In addition, if two continuously married adults were a couple, only one of them was selected into the comparison group. This left a sample size of 1611 continuously married adults.

Measures

Depression

Depression in the HRS was measured by an abbreviated and modified 8-item version of the Center for Epidemiological Studies—Depression Scale (CES-D) with a yes/no response format (Karim et al., 2015; Radloff, 1977). The wording and response format of the HRS CES-D was consistent for the seven waves used for this study. Respondents were asked to indicate whether they had experienced any of the following symptoms most of the time during the previous week: (a) felt depressed, (b) felt activities were an effort, (c) had restless sleep, (d) felt happy, (e) felt lonely, (f) enjoyed life, (g) felt sad, and (h) felt unmotivated. Responses were coded 1 (*yes*) and 0 (*no*). The score ranges from 0 to 8, with higher scores reflecting higher levels of depression. Cronbach's α was .83 (Steffick, 2000). Among 446 widowed adults in the study, 203 of them (45.5%) did not report any symptoms at baseline, and 71 of them (15.9%) reported 4 or more symptoms at baseline. Some researchers have used a cut-off score of 4 as an indication of significant depressive symptoms (Zivin et al., 2010). According to Steffick (2000), a cut-off score of 4 in the 8-item version of HRS CES-D has been found comparable to the cut-off score of 16 in the 20-item original CES-D.

Socio-Demographic Characteristics

Respondent's age, gender, ethnicity, education level, and household income were included in the analyses. Age was calculated for each respondent at the base wave based on respondents' birthday. The ethnicity variable was dichotomized as White (those who self-identified as White) and Non-White (all other respondents). Household income information was obtained from the RAND version of the HRS dataset, natural log transformed and adjusted for inflation. A detailed technical description of wealth and income calculations and imputations can be found in Hurd et al. (2016). Among 446 widowed adults in the study, 22 of them (54.50% male) were either remarried (n = 12) or partnered (n = 10) after post wave 1.

Spousal Caregiver Status

Spousal caregiver status was defined as the way it was done in previous studies (Kaufman et al., 2018). Respondents who reported needing help with ADLs were first identified, and their spouses were identified and labeled as a caregiver if the spouses were reported as primary caregivers.

Religious Attendance

Religiosity is most commonly measured by religious attendance (Idler et al., 2003), which was queried with a single question: "About how often have you attended religious services during the last year?" The response categories for this item included (1) not at all, (2) one or more times a year, (3) two or three times a month, (4) once a week, and (5) more than once a week.

Positive and Negative Social Support

Both positive social support (PSS) and negative social support (NSS) were measured in four different relationship domains: spouse/partner, children, family, and friends. PSS was

measured by three items within each domain: (a) How much do they really understand the way you feel about things? (b) How much can you rely on them if you have a serious problem? and (c) How much can you open up to them if you need to talk about your worries? NSS was measured by four items within each domain: (d) How often do they make too many demands on you? (e) How much do they criticize you? (f) How much do they let you down when you are counting on them? and (g) How much do they get on your nerves? All items were measured on a scale from 1 ("A lot") to 4 ("Not at all"). All items were first reverse coded, and then an index of PSS and an index of NSS were created for each domain by averaging the scores within each dimension. The Cronbach α for four PSS scale ranged from .81 to .86; the Cronbach α for four NSS scale ranged from .75 to .79 (HRS Psychosocial Working Group, 2013). The final score was set to missing if there was more than one item with missing values for the PSS scale or more than two items with missing values for the NSS scale.

Self-Rated Health

A single item was used to assess self-rated health. Respondents rated their health on a scale ranging from 1 (*poor*) to 5 (*excellent*) in response to the question, "Would you say your health is excellent, very good, good, fair, or poor?" The self-rated health of the deceased spouse before death was used as an indirect and expedient measure of the mode of death: sudden (4 and 5) or expected (1 and 2). This approach is in line with previous studies (Sasson & Umberson, 2014).

Functional Limitations

Functional limitations were measured using both activities of daily living (ADLs). Respondents were instructed to include any difficulties that lasted for more than three months. Respondents were classified as having ADL limitations if they reported difficulty or inability

with at least one of the following: dressing, eating, or getting out of bed. Cronbach's α for the ADL scales reportedly is .84 (Fonda & Herzog, 2004).

Analytic Plan

After data cleaning and preparation, I first computed analyses to examine and present descriptive statistics (means and standard deviations for continuous variables and percentage for categorical variables) and correlations for all variables of interest in the study. Then, I compared the differences in characteristics at baseline and depression levels at four waves between widowed and continuously married adults using the χ^2 test for independence and *t*-test. I also conducted paired-samples *t*-tests to compare five key continuous variables at baseline and immediate wave after for both widowed and continuously married adults.

To better address the heterogeneity of depression trajectories in the transition to widowhood, I conducted a series of latent growth class analysis (LGCA) models using Mplus® 7.4 (Muthén & Muthén, 1998-2017) to identify respondents with distinct depression trajectories (i.e., classes) prior to and after widowhood. Three univariate latent growth curve models (i.e., intercept only, linear, quadratic) without covariates were first conducted. After examining the observed plots, a univariate quadratic growth curve model was chosen as the starting point for a series of LGCA models (Figure 2). To determine the optimal number of classes, I made a decision based on existing studies (Galatzer-Levy & Bonanno, 2012; Lotterman et al., 2014; Maccallum et al., 2015) as well as entropy and three fitting indexes—Bayesian information criteria (BIC) value, *p*-values of Lo, Mendell, and Rubin likelihood ratio test (LMR-LRT) and the bootstrap likelihood ratio test (BLRT) (Ha, 2008; Wang & Wang, 2012).

An unconditional LGCA model was first ascertained. Based on the extant literature, I expected that there might be four distinct trajectories of depressive symptoms prior to and after

widowhood: *No Depression*, *Increasing Depression*, *Decreasing Depression*, and *Chronic Depression*.

After the optimal number of the classes for the unconditional LCGA model was ascertained, sequential multinomial logistic regressions were computed to identify demographic variables and contextual factors that can differentiate respondents in distinct depression trajectory groups.

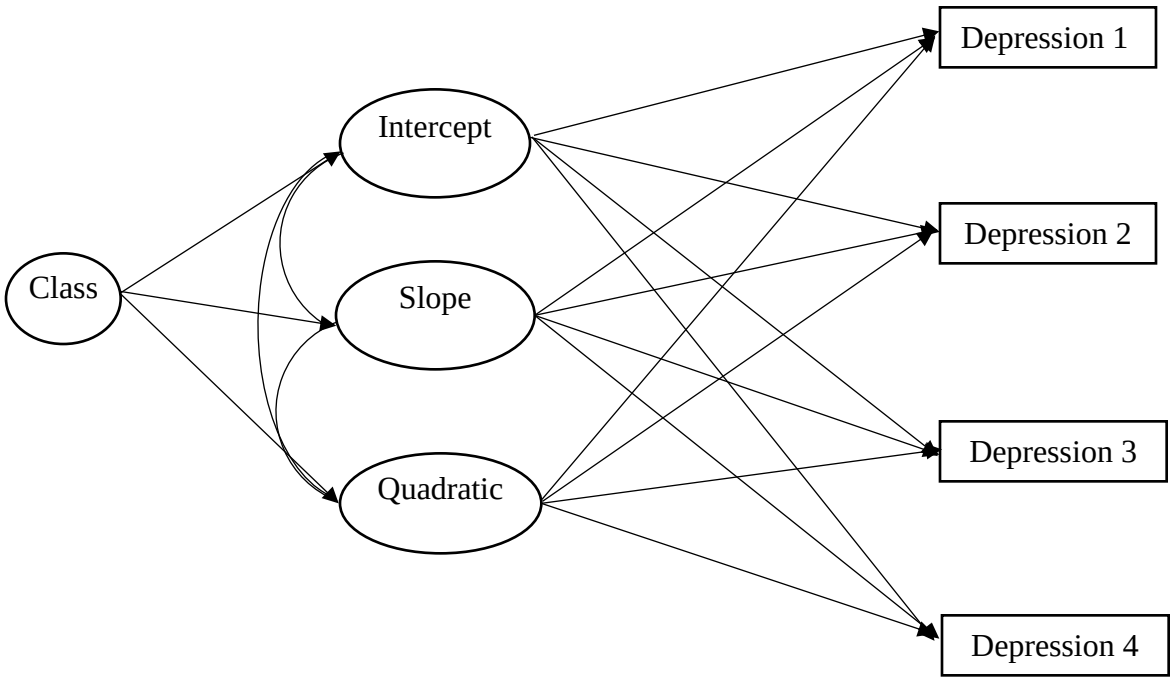

Figure 2. Latent Class Growth Analysis on the Trajectories of Depression Scores.

Note. An oval shape represents a latent variable, and a rectangular shape represents a manifest variable.

The Monte Carlo simulation was applied in Mplus® 7.4 (Muthén & Muthén, 1998-2017) to conduct a power analysis for the LCGA model shown in Figure 1. Based on previous studies (Galatzer-Levy & Bonanno, 2012; Lotterman et al., 2014; Maccallum et al., 2015), a 4-class non-linear growth model was specified as the base model for the Monte Carlo simulation. I simulated

four classes represented by four groups (i.e., *No Depression, Increasing Depression, Decreased Depression, and Chronic Depression*) of older adults in the transition to widowhood, and the parameters for the latent intercept, latent slope, and latent quadratic term of these four classes were specified using the values found in Maccallum et al. (2015). The sample size of the simulated models was set at $n = 500$. The number of cases in each identified class was assumed to vary. I specified 25% of cases in each class as a starting point, and then specified 8% in *Chronic Depression* group, 11% in *Increasing Depression* group, 15% in *Decreasing Depression* group, and 65% in the *No Depression* group to replicate the classes found in Maccallum et al. (2015). The number of independent variables for the latent class variable was also varied from 1 to 10. The mean and standard deviation of these predicators were set at 0 and 1, respectively. To make sure the model had the power needed, I simulated a model with the least possible power by specifying that only one predictor had an effect on only one path of the four classes regardless of how many independent variables were included in the model. The coefficient of this path was set at .51 as a starting value. This value is equal to an odds ratio of 1.68, a small effect size equivalent to Cohen's $d = .2$ (Chen et al., 2010). For the 4-class LCGA model ($n = 500$) with varying size in each class and with 10 independent variables on the latent class variable, the power for the path with a coefficient of .51 is .65. I then increased gradually the value of the coefficient and computed a series of the simulated models. The results indicated that a coefficient of .60 (i.e., an odds ratio of 1.82, a small to moderate effect size) will suffice to achieve a power of .80 for the LCGA model ($n = 500$) with varying size in each class and with 10 independent variables on the latent class variable.

CHAPTER 4
RESULTS

This chapter summarizes the statistical results of this study. I will present the results in eight sections: (1) missing data analysis and multiple imputation, (2) characterization of the samples and the correlation matrix of the main variables in the study, (3) baseline differences between widowed and continuously married adults, (4) pre- and post-loss comparisons on key continuous variables for both widowed and continuously married adults, (5) LCGA of the depression trajectories, (6) comparison among widowed adults with distinct depression trajectories, (7) comparison among continuously married adults with distinct depression trajectories, and (8) sequential multinomial logistic regressions.

Missing Data Analysis and Multiple Imputation

After applying the sample inclusion criteria illustrated by the flow chart in Figure 1 in Chapter 4, 446 widowed adults and 1,611 continuously married adults were left in the study. Among 446 widowed adults, 69 of them dropped out of the study at post wave 3 (the last wave). I conducted independent *t*-tests to examine whether there were significant differences in independent variables between those 69 widowed adults and those who remained in the study. The results show significant differences between these two groups of widowed adults on age and health-related variables. More specifically, those who dropped out of the study were older, reported lower self-rated health, and reported more ADL impairments than those who remained in the study. Besides, the spouses of those who dropped out also reported more ADL impairments. Whereas there might be multiple dropout reasons for a respondent, the results of the above analysis indicate that it is more likely that those 69 respondents might have passed away or dropped out of the study due to health-related reasons.

There were no missing values for variables such as age, gender, widowhood status, PSS from the spouse, self-rated health, ADL impairment, and household income at the base wave. Due to the inclusion criteria, there were no missing depression scores at base wave and post wave 1, and the rate of missing data for depression score at post wave 2 and post wave 3 were 0.44% and 5.10%, respectively. For all the other variables used in the study, the rate of missing values ranged from 0.15% (education and NSS from the spouse) to 6.95% (NSS from children). I conducted independent *t*-tests to examine whether there were significant differences in predictor variables between respondents with missing data and those with complete data. The results show no difference in major variables between respondents with and without missing values on post wave 2 depression, indicating the missing data were likely due to randomness. However, significant differences were found between respondents with and without missing values on post wave 3 depression. Compared with those who had complete data, respondents with missing values on post wave 3 depression were older, receiving fewer years of education, having a lower household income and a longer marriage history, and reporting poorer physical and mental health, indicating the nature of the missingness of depression score in the last wave might be missing not at random. With caution, full information maximum likelihood (FIML) estimation was used when running the latent class growth analysis in Mplus.

Among all the other variables used in the study, PSS and NSS from children and friends had rates of missing values (ranging from 6.12% to 6.95%) slightly more than 5%. The results of *t*-tests show that there were significant differences in variables such as age and religious attendance between respondents with and without missing values on these PSS- and NSS-related variables. More specifically, respondents with missing data on these variables attended church less frequently than those with complete data. Besides, respondents with missing data on social

support variables from children and friends were significantly younger, and respondents with missing values on social support variables from other family members were significantly older than those with complete data. However, no significant differences in depression scores and many other variables were found, indicating the missingness might be due to randomness and conditioned on certain variables.

Based on the analysis above, I conducted five imputations using the multivariate imputation by chained equations (MICE) algorithm in SPSS. Fully conditional specifications (FCS) was chosen as the imputation method with the maximum iterations set at 50. The predictive mean matching (PMM) procedure was selected as the model type for scale variables. Convergence was good based on convergence plots generated using the means and standard deviations of the imputed values at each round of iteration and imputation. Since the pooled estimates and related statistics of many statistical analyses (e.g., the χ^2 test for independence and multinomial logistic regression) cannot be obtained using the pooled dataset, I merged the five iterated datasets into a single dataset using the "bar procedure" (Baranzini, 2018). Except for the descriptive analysis of the samples, all the other statistical analyses were computed using this merged dataset.

Descriptive Statistics and Bivariate Correlations of the Samples

Table 3 shows the baseline demographics of widowed respondents (in each study cohort and in total) and continuously married adults. The average age of widowed adults and continuously married adults were 71.70 and 64.00, respectively, and the average marriage length of adults in these two groups were 42.80 and 35.53 years, respectively. The majority of the adults

Table 3

The Demographics of Widowed Adults in Each Study Cohort and Continuously Married Adults at Base Wave

Variables	Cohort 1 (n = 56)	Cohort 2 (n = 141)	Cohort 3 (n = 133)	Cohort 4 (n = 116)	All Widowed (n = 446)	Continuously Married (n = 1,611)
Age	71.16 (9.20)	71.31 (9.05)	72.82 (9.26)	71.16 (10.51)	71.70 (9.53)	64.00 (9.25)
Gender						
Male	19 (33.93%)	44 (31.21%)	49 (36.84%)	27 (23.28%)	139 (31.17%)	593 (36.81%)
Female	37 (66.07%)	97 (68.79%)	84 (63.16%)	89 (76.72%)	307 (68.83%)	1,018 (63.19%)
Ethnicity						
White	45 (80.36%)	111 (78.72%)	107 (80.45%)	92 (79.31%)	355 (79.60%)	1348 (83.67%)
Non-white	10 (17.86%)	26 (18.44%)	23 (17.29%)	22 (18.97%)	81 (18.16%)	232 (14.40%)
Missing	1 (1.79%)	4 (2.84%)	3 (2.26%)	2 (1.72%)	10 (2.24%)	31 (1.92%)
Education (Years)	11.66 (3.18)	12.65 (3.06)	12.26 (3.22)	12.68 (2.72)	12.41 (3.05)	13.14 (2.88)
Marriage Length (Years)	42.68 (16.49)	43.99 (15.53)	41.27 (18.91)	43.16 (16.67)	42.80 (16.98)	35.53 (14.46)
First Marriage						
Yes	39 (69.64%)	110 (78.01%)	93 (69.92%)	82 (70.69%)	324 (72.65%)	1138 (70.64%)
No	17 (30.36%)	31 (21.99%)	40 (30.08%)	34 (29.31%)	122 (27.35%)	473 (29.36%)

Note. The percentages may not add up to 100% due to rounding errors. Means and standard deviations are for continuous variables; frequencies and percentages are for categorical variables. First marriage = Marriage at base wave was the first marriage

Table 4

Correlation Matrix of Variables Used in the Study

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	—	-.24**	.06*	-.15**	-.18**	.57**	.08**	.05	.07**	.08**	-.06*	.19**	-.20**
2. Female	-.14**	—	-.01	.01	.06*	-.06*	.00	-.01	-.09**	-.13**	.04	.10**	.01
3. White	.12**	-.01	—	.28**	.22**	.07**	.01	-.02	.07**	.11**	-.09**	-.02	-.07**
4. Years of education	.05	-.01	.36**	—	.37**	-.13**	-.01	-.08**	.05*	.11**	-.07**	-.06*	-.03
5. Household income	-.02	-.06	.27**	.40**	—	-.12**	-.01	-.16**	.03	.07**	-.04	-.04	-.04
6. Marriage length	.61**	-.03	.04	.02	.00	—	.66**	.02	.05*	.05*	-.04	.23**	-.15**
7. First marriage	.16**	-.05	-.01	.06	.02	.66**	—	.03	-.01	.00	.00	.17**	-.07**
8. Caregiver	.19**	-.06	.08	-.01	-.02	.14**	.02	—	-.08**	-.15**	.15**	-.06*	.11**
9. R Closeness w/ S	.03	-.13**	.10*	.06	.11*	-.01	-.04	-.04	—	.67**	-.50**	.17**	-.15**
10. Spouse PSS	.06	-.16**	.07	.05	.14**	-.02	-.06	-.22**	.63**	—	-.54**	.25**	-.17**
11. Spouse NSS	-.08	.12*	-.19**	-.07	-.15**	-.01	.01	.10*	-.55**	-.54**	—	-.19**	.41**
12. Children PSS	.17**	.08	-.05	-.07	-.02	.21**	.12*	.01	.10*	.14**	-.12*	—	-.38**
13. Children NSS	-.26**	-.01	-.15**	-.03	-.04	-.20**	-.05	-.11*	-.10*	-.09	.35**	-.41**	—
14. OFM PSS	.10*	.04	-.14**	-.15**	-.07	.05	.04	-.02	.05	.11*	-.11*	.41**	-.17**
15. OFM NSS	-.28**	-.01	-.16**	-.06	-.03	-.22**	-.14**	-.07	-.07	-.09*	.27**	-.22**	.59**
16. Friends PSS	-.02	.11*	.00	-.04	.03	.04	.02	.02	-.04	.04	-.03	.31**	-.06
17. Friends NSS	-.17**	-.02	-.13**	-.07	-.06	-.17**	-.08	-.06	-.01	-.04	.19**	-.24**	.39**
18. Religious attendance	.13**	.10*	-.19**	-.13**	-.14**	.13**	.08	-.05	.03	.03	-.01	.10*	-.06
19. S Self-rated health	.08	.01	.08	.10*	.10*	.05	.00	-.38**	.09*	.13**	-.15**	.10*	-.06
20. R Self-rated health	.02	.05	.26**	.24**	.21**	.00	.02	-.05	.08	.08	-.16**	.18**	-.20**
21. S ADL impairment	.10*	-.05	-.01	-.11*	-.07	.08	-.01	.74**	-.04	-.17**	.13**	-.02	-.05
22. R ADL impairment	.02	.00	-.09	-.16**	-.07	.04	.04	.07	-.08	-.11*	.09	-.07	.10*
23. Base depression	-.12*	.07	-.13**	-.14**	-.15**	-.07	-.05	.08	-.18**	-.25**	.25**	-.20**	.23**
24. Post1depression	-.18**	.06	-.11*	-.12*	-.12**	-.12*	-.04	-.02	.00	-.04	.13**	-.20**	.26**
25. Post2 depression	-.10*	.04	-.10*	-.16**	-.15**	-.04	-.04	-.01	-.01	.02	.06	-.21**	.26**
26. Post3 depression	-.04	.02	-.16**	-.16**	-.20**	-.06	-.06	.03	-.04	-.03	.12*	-.27**	.34**

(*table continues*)

Table 4 (*continued*)

	14	15	16	17	18	19	20	21	22	23	24	25	26
1. Age	.02	-.19**	-.08**	-.13**	.16**	-.08**	-.10**	.01	.07**	-.07**	-.07**	-.03	-.01
2. Female	.14**	.04	.23**	-.07**	.08**	-.02	.04	-.04	-.02	.07**	.07**	.04	.03
3. White	-.11**	-.10**	.07**	-.13**	-.12**	.16**	.20**	-.05*	-.10**	-.10**	-.12**	-.12**	-.08**
4. Years of education	-.07**	-.03	.09**	-.03	-.03	.27**	.28**	-.10**	-.12**	-.18**	-.18**	-.21**	-.19**
5. Household income	-.04	-.02	.07**	-.05*	-.03	.25**	.23**	-.15**	-.12**	-.13**	-.15**	-.14**	-.12**
6. Marriage length	.04	-.11**	-.08**	-.09**	.17**	-.05*	-.02	-.03	.02	-.06*	-.07**	-.07**	-.08**
7. First marriage	.05*	-.06*	-.06*	-.01	.11**	.01	.04	-.02	-.02	-.06**	-.07**	-.10**	-.09**
8. Caregiver	-.04	.03	-.06*	.05*	-.02	-.37**	-.12**	.80**	.14**	.12**	.11**	.10**	.11**
9. Closeness w/ spouse	.10**	-.09**	.04	-.09**	.08**	.12**	.09**	-.06*	.02	-.18**	-.16**	-.17**	-.15**
10. Spouse PSS	.15**	-.11**	.12**	-.10**	.03	.15**	.11**	-.09**	-.06*	-.26**	-.21**	-.25**	-.23**
11. Spouse NSS	-.14**	.29**	-.06*	.27**	-.02	-.17**	-.11**	.10**	.05	.24**	.17**	.20**	.19**
12. Children PSS	.41**	-.18**	.28**	-.13**	.12**	.03	.11**	-.05*	-.03	-.13**	-.15**	-.14**	-.16**
13. Children NSS	-.18**	.49**	-.07**	.41**	-.05	-.09**	-.14**	.09**	.12**	.19**	.18**	.16**	.19**
14. OFM PSS	—	-.23**	.35**	-.11**	.12**	.04	.06*	-.02	-.03	-.05*	-.09**	-.06**	-.07**
15. OFM NSS	-.13**	—	-.03	.49**	-.06*	-.06*	-.10**	.05*	.10**	.16**	.17**	.22**	.18**
16. Friends PSS	.28**	.02	—	-.06*	.08**	.03	.11**	-.05*	-.09**	-.05*	-.07**	-.06*	-.08**
17. Friends NSS	-.15**	.43**	-.18**	—	-.03	-.09**	-.11**	.07**	.09**	.11**	.14**	.14**	.19**
18. Religious attendance	.15**	-.13**	.08	-.02	—	.01	.04	-.05*	.01	-.09**	-.07**	-.05*	-.10**
19. S Self-rated health	.10*	-.03	.01	-.08	.05	—	.26**	-.32**	-.12**	-.15**	-.13**	-.14**	-.14**
20. R Self-rated health	.08	-.20**	.09*	-.23**	.01	.14**	—	-.11**	-.31**	-.35**	-.32**	-.34**	-.36**
21. S ADL impairment	-.04	-.04	.00	.01	-.06	-.38**	-.08	—	.13**	.10**	.09**	.07**	.10**
22. R ADL impairment	-.02	.11*	-.05	.08	-.08	-.09	-.36**	.13**	—	.27**	.22**	.30**	.25**
23. Base depression	-.10*	.22**	-.11*	.26**	-.14**	-.20**	-.38**	.12**	.26**	—	.53**	.58**	.50**
24. Post1 depression	-.15**	.26**	-.11*	.21**	-.16**	-.05	-.29**	.01	.24**	.41**	—	.56**	.55**
25. Post2 depression	-.06	.17**	-.11*	.22**	-.07	-.10*	-.30**	.02	.20**	.39**	.49**	—	.59**
26. Post3 depression	-.03	.24**	-.09	.17**	-.02	-.08	-.31**	.03	.21**	.39**	.48**	.63**	—

Note. The results for the widowed adults (n = 446) are shown below the diagonal. The results for continuously married adults (n = 1,611) are shown above the diagonal. First marriage = marriage at base wave was the first marriage; Caregiver = Respondent was spouse's caregiver at base wave; PSS = positive social support; NSS = negative social support; OFM = other family members; S = spouse; R = respondent. $^{*}p < .05$. $^{**}p < .01$.

were female (68.83% widowed adults and 63.19% continuously married adults), White (79.60% widowed adults and 83.67% continuously married adults), and in their first marriage (72.65% widowed adults and 70.64% continuously married adults).

The correlation matrix of the variables for widowed adults and continuously married adults is presented in Table 4. The highest correlation coefficient is between the ADL impairment of the spouse and being a caregiver of the spouse, and this is true for both the widowed adults, $r(444) = .74$, $p < .001$, and continuously married adults, $r(1609) = .80$, $p < .001$. Not surprisingly, the baseline closeness with the spouse was positively correlated with the positive social support (PSS) from the spouse and negatively correlated with the negative social support (NSS) from the spouse for both the widowed and continuously married adults. Besides, the PSS from different sources (i.e., spouse, children, other family members, and friends) were significantly correlated with each other for both samples, and this was also true for the NSS from different sources. The PSS and NSS from the same source were negatively correlated with each other, but the correlation coefficients were relatively small. Depression scores at four waves were highly correlated with each other, but the correlations are stronger among continuously married adults than among widowed adults. For both widowed and continuously married adults, respondents' self-rated health was negatively correlated and functional limitations were positively correlated with their depression scores at all four waves. The PSS and NSS from the children were also correlated with the depression scores at four waves for both widowed and continuously married adults.

Comparison Between Widowed and Continuously Married Adults

The χ^2 tests for independence (Table 5) and *t*-tests (Table 6) were conducted to examine baseline differences between widowed adults and continuously married adults. As shown in these two tables, there are distinct differences between these two groups of adults.

Table 5

The Results of the χ^2 Tests for Independence between Widowed Adults (n = 446) and Continuously Married Adults (n = 1,611)

	Widowed		Continuously Married		$\chi^2(1)$
	n	%	*n*	%	
Gender					4.85*
Male	139	31.17%	593	36.81%	
Female	307	68.83%	1018	63.19%	
Ethnicity					4.51*
Non-White	84	18.83%	237	14.71%	
White	362	81.17%	1374	85.29%	
First marriage					0.64
No	122	27.35%	472	29.30%	
Yes	324	72.65%	1139	70.70%	
Caregiver					332.24***
No	230	51.57%	1443	89.57%	
Yes	216	48.43%	168	10.43%	
S ADL impairment					227.13***
No	268	60.09%	1450	90.01%	
Yes	178	39.91%	161	9.99%	
R ADL impairment					8.81**
No	389	87.22%	1479	91.81%	
Yes	57	12.78%	132	8.19%	

Note. First marriage = Marriage at base wave was the first marriage; Caregiver = Respondent was spouse's caregiver at base wave; S = Spouse; R = Respondent.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 6

The Results of the Independent T-Tests Between Widowed Adults (*n = 446) and Continuously Married Adults* (*n = 1611)*

	Widowed		Continuously Married		*t(2,055)*	Cohen's *d*
	M	*SD*	*M*	*SD*		
Age	71.70	9.53	64.00	9.25	15.47***	0.78
Education	12.41	3.05	13.14	2.88	-4.64***	-0.25
Household Income	14.24	2.21	14.82	1.58	-6.32***	-0.33
Marriage Length	42.40	17.09	35.36	14.46	8.73***	0.46
Closeness w/ Spouse	3.40	0.76	3.51	0.66	-2.88**	-0.14
Spouse PSS	3.21	0.82	3.53	0.58	-9.25***	-0.49
Spouse NSS	2.11	0.73	1.97	0.65	3.91***	0.21
Children PSS	3.38	0.64	3.24	0.69	3.70***	0.20
Children NSS	2.11	0.73	1.97	0.65	-2.93**	-0.16
OFM PSS	3.00	0.82	2.85	0.58	3.22**	0.17
OFM NSS	1.65	0.58	1.75	0.61	-2.41**	-0.13
Friends PSS	3.10	0.70	3.05	0.73	1.35	0.07
Friends NSS	1.38	0.47	1.41	0.45	-1.59	-0.09
Religious Attendance	2.88	1.46	3.01	1.43	-1.73	-0.09
S Self-Rated Health	2.30	1.13	3.42	1.02	-19.88***	-0.97
R Self-Rated Health	3.20	1.09	3.48	0.99	-5.16***	-0.27
Base wave depression	1.46	1.94	1.06	1.65	4.41***	0.23
Post wave 1 depression	2.36	2.42	1.03	1.64	13.55***	0.69
Post wave 2 depression	1.79	2.12	1.02	1.69	7.97***	0.42
Post wave 3 depression	1.59	2.02	1.04	1.62	5.66***	0.32

Note. PSS = positive social support; NSS = negative social support; OFM = other family members; S = spouse; R = respondent. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Demographically, widowed adults were more likely than continuously married adults to be older, female, non-White, having fewer years of education, and having a lower household income. On marriage-related variables, widowed adults had a longer marriage history at the base wave, but there were no significant differences between the two groups of respondents regarding whether their marriage at the base wave was the first one. Widowed adults also reported a lower baseline closeness score with their spouse compared with continuously married adults. In terms of PSS, widowed adults reported a lower score from their spouse but a higher score from their

children and other family members. In terms of NSS, widowed adults reported a higher score from their spouse and children but a lower score from other family members. Besides, there were significant group differences in health condition and functional limitations between widowed adults and continuously married adults, and this is true for both respondents and their spouse. Not surprisingly, the strongest effect size was found for the self-rated health of the spouse in differentiating widowed and continuously married adults. Compared with the spouse of continuously married adults, the spouse of widowed adults reported a significantly lower self-rated health, and they were more likely to report ADL impairment.

Finally, there were also significant differences in depression scores between widowed adults and continuously married adults, and this is true for all four waves. Notably, the biggest difference in depression score between these two groups of adults was seen in post wave 1, closest to the time when the respondent in the widowed sample had lost their spouse.

Pre- and Post-Comparison on Key Variables

Paired samples t-tests were conducted to compare five key continuous variables in baseline and post wave 1 for both widowed and continuously married adults. As shown in Table 7, there was a significant decrease in self-rated health for continuously married adults but not for widowed adults. In contrast, both the frequency of religious attendance and depression score increased from base wave to post wave 1 for widowed adults, but no significant differences in these two variables were found among continuously married adults. Finally, for adults in both groups, the household income decreased significantly across waves.

Table 7

The Results of the Paired Samples t-tests on Key Continuous Variables in Baseline and Post Wave 1 for Widowed Adults (n = 446) and Continuously Married Adults (n = 1611)

	Widowed				Continuously Married			
	M	*SD*	*t*(*445*)	Cohen's *d*	*M*	*SD*	*t*(*1609*)	Cohen's *d*
Self-rated health			0	0			5.65***	0.14
Baseline	3.20	1.09			3.48	0.99		
Post Wave 1	3.20	1.06			3.37	0.98		
Religious attendance			-2.49*	-0.12			0.33	0.01
Baseline	2.88	1.46			3.01	1.43		
Post Wave 1	3.00	1.41			3.01	1.43		
Depression score			-7.90***	-0.37			0.74	0.02
Baseline	1.46	1.94			1.06	1.65		
Post Wave 1	2.36	2.42			1.03	1.64		
Household income			6.48***	0.31			2.61**	0.07
Baseline	14.24	2.21			14.82	1.58		
Post Wave 1	13.03	4.09			14.69	2.02		
ADL total score			-1.15	0.05			-0.98	-0.02
Baseline	0.22	0.70			0.13	0.52		
Post Wave 1	0.25	0.73			0.14	0.54		

*$p < .05$. **$p < .01$. ***$p < .001$.

Latent Class Growth Analysis

A latent class growth analysis (LCGA) was conducted to identify respondents with distinct depression trajectories. Three univariate latent growth curve models (i.e., intercept only; intercept and linear; intercept, linear, and quadratic) without covariates were first fit to the data. After examining the plots of the results, a quadratic growth curve model was chosen as the starting point for a series of non-linear LCGA models. The number of classes specified for those models ranged from 2 to 5 (Table 8).

Determining the optimal number of classes depends on many factors, such as fitting indices, parsimony, size of subgroups, previous studies, and theoretical justification. According to Jung & Wickrama (2007), a model with a low Bayesian information criteria value and a

significant Lo, Mendell, and Rubin likelihood ratio test *P*-value comparing the k and the k-1 class model could be used to guide the initial analysis. Table 8 shows the fit indices for the LCGA models using the widowed sample, the continuously married sample, and the combined sample. Since the results for the widowed and continuously married adults are similar, I decided to compute the LCGA using both widowed and continuously married adults to ease the comparison between adults in these two groups, Based on comparisons of fit indices, I adopted a 4-class model as providing the best fit to the combined sample on depression over time for all respondents in the study (Ferguson et al., 2020). The No Depression group (NDG) consists of respondents whose depression score remained low, the Increasing Depression group (IDG) whose depression score was low in the beginning but increased over time, the Decreasing Depression group (DDG) whose high depression score decreased over time, and the Chronic Depression group (CDG) whose depression score was chronically high.

Within each trajectory group, two lines were drawn in Figure 3 based on the average depression score at each of the four waves, one solid line for the widowed adults and one dotted line for the continuously married adults. The percentages of respondents in each trajectory for both widowed adults and continuously married adults are shown in Figure 3. The proportion of adults in four depression trajectories differ significantly between widowed and continuously married adults, χ^2 (3, N = 2057) = 88.29, $p < .001$. Compared with continuously married adults, widowed adults were significantly less likely to be in the NDG.

Table 8

Fit Indexes of Models with Different Number of Classes Specified for Widowed Adults and Continuously Married Adults

		BIC	Adjusted BIC	LMR-LRT *P*-value	BLRT *P*-value	Entropy
Widowed	1-Class Model	7030.86	7084.17			
	2-Class Model	6941.87	6986.97	< .001	< .001	.876
	3-Class Model	6826.36	6887.87	.440	< .001	.867
	4-Class Model	6728.68	6806.59	.002	< .001	.901
	5-Class Model	6659.33	6753.64	.400	< .001	.894
Continuously Married	1-Class Model	22261.24	22331.24			
	2-Class Model	21842.47	21901.70	< .001	< .001	.963
	3-Class Model	21195.01	21275.78	< .001	< .001	.945
	4-Class Model	20861.79	20964.09	.005	< .001	.952
	5-Class Model	20629.55	20753.40	.698	< .001	.935
Combined	1-Class Model	29850.40	29809.10			
	2-Class Model	29228.05	29193.10	< .001	< .001	.948
	3-Class Model	28623.24	28575.58	.127	< .001	.932
	4-Class Model	28124.36	28064.10	.009	< .001	.947
	5-Class Model	27857.87	27784.79	.202	< .001	.941

Note. BIC = Bayesian information criteria. LMR-LRT = Lo, Mendell, and Rubin likelihood ratio test. BLRT = bootstrap likelihood ratio test.

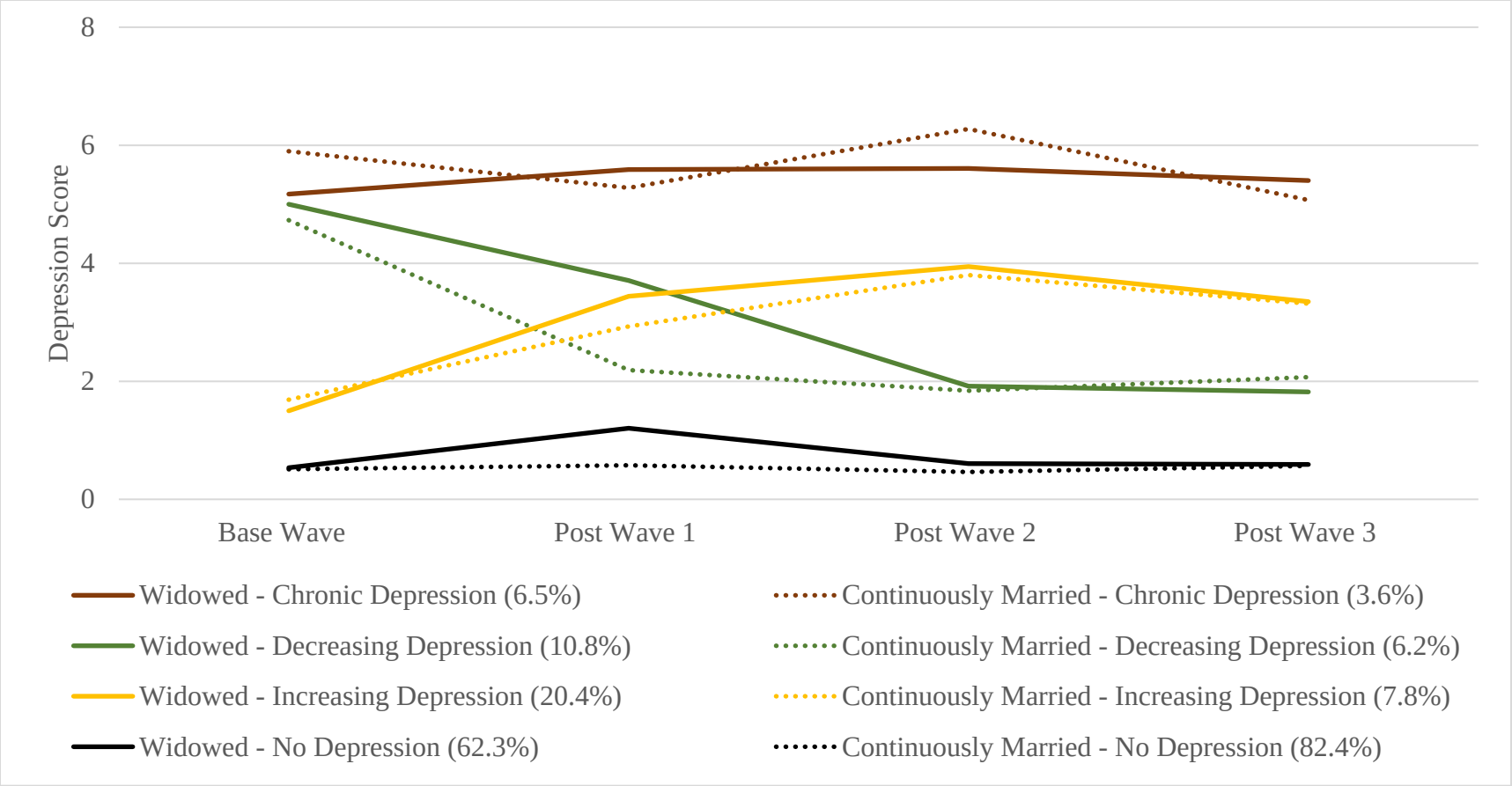

Figure 3. Depression Trajectories for Widowed Adults (n = 446) and Continuously Married Adults (n = 1611).

Note. The latent class growth analysis identified four depression trajectories using both widowed and continuously married adults. Within each trajectory group, two lines were drawn based on the average depression score at each of the four waves, one solid line for the widowed adults and one dotted line for the continuously married adults.

Comparison Among Widowed Adults with Distinct Depression Trajectories

Baseline differences among widowed adults in four distinct trajectories were inspected using the χ^2 test for independence (Table 9) and a one-way ANOVA (Table 10). Among all the categorical variables, significant group differences were only found on respondents' ADL impairment, χ^2 (3, n = 446) = 39.19, p < .001 (Table 9). Whereas only 5.40% of adults in the NDG reported ADL impairment, more than one third (34.48%) of adults in CDG did so. As shown in Table 10, the ANOVA results indicate that there were significant group differences in all continuous variables except for the positive social support from friends. The significant differences in depression scores of four waves and respondents' self -rated health had η^2 values greater than 0.14, indicating large effects (Cohen, 1988). All the other significant findings only had small or medium effect sizes. A series of Bonferroni post-hoc tests were performed to compare differences for each possible pair. Most group differences were found between the NDG and CDG. Adults in the NDG showed significantly higher values than adults in the CDG on household income, closeness with the spouse, PSS from the spouse, children, and other family members, self-rated health of spouse, and respondents' own self-rated health. Aside from differences in depression scores, significant differences in other variables were also found among adults in the NDG, IDG, and DDG. For example, compared with adults in the NDG, adults in the IDG reported higher NSS from children and friends and had lower self-rated health scores of both their own and their spouse. Similarly, adults in the DDG reported lower education level, lower PSS from the spouse, higher NSS from friends, and lower self-rated health scores of their own and their spouse than adults in the NDG.

Table 9

The Results of χ^2 Test for Independence among Widowed Adults with Four Distinct Depression Trajectories

	No Depression (n = 278)		Increasing Depression (n = 91)		Decreasing Depression (n = 48)		Chronic Depression (n = 29)		$\chi^2(3)$
	n	%	n	%	n	%	n	%	
Gender									3.68
Male	91	32.73%	31	34.07%	11	22.92%	6	20.69%	
Female	187	67.27%	60	65.93%	37	77.08%	23	79.31%	
Ethnicity									5.80
Non-White	43	15.47%	21	23.08%	13	27.08%	7	24.14%	
White	235	84.53%	70	76.92%	35	72.92%	22	75.86%	
First marriage									5.06
No	69	24.82%	24	26.37%	18	37.50%	11	37.93%	
Yes	209	75.18%	67	73.63%	30	62.50%	18	62.07%	
Caregiver									3.52
No	150	53.96%	47	51.65%	19	39.58%	14	48.28%	
Yes	128	46.04%	44	48.35%	29	60.42%	15	51.72%	
S ADL impairment									6.66
No	175	62.95%	56	61.54%	21	43.75%	16	55.17%	
Yes	103	37.05%	35	38.46%	27	56.25%	13	44.83%	
R ADL impairment									39.19***
No	263	94.60%	71	78.02%	36	75.00%	19	65.52%	
Yes	15	5.40%	20	21.98%	12	25.00%	10	34.48%	

Note. First marriage = Marriage at base wave was the first marriage; Caregiver = Respondent was spouse's caregiver at base wave; S = Spouse; R = Respondent. ***$p < .001$.

Table 10

Means and Standard Deviations of Continuous Variables of Respondents in Four Widowed Groups and the Results of One-Way ANOVAS

	No Depression (n = 278)	Increasing Depression (n = 91)	Decreasing Depression (n = 48)	Chronic Depression (n = 29)	F (3, 462)	η^2
Age	72.35_{a} (9.47)	72.55_{a} (9.35)	68.83_{a} (9.44)	67.62_{a} (9.27)	3.97^{**}	0.03
Education	12.76_{a} (2.93)	12.01_{ab} (2.89)	11.50_{b} (3.86)	11.86_{ab} (2.70)	3.56^{*}	0.02
Household income	14.42_{a} (2.05)	14.19_{ab} (1.28)	13.87_{ab} (1.07)	13.23_{b} (5.22)	3.14^{*}	0.02
Marriage length	43.33_{a} (17.08)	43.99_{a} (17.35)	37.01_{a} (15.57)	37.42_{a} (17.05)	2.99^{*}	0.02
Closeness w/ Spouse	3.43_{a} (0.77)	3.53_{ab} (0.62)	3.19_{ab} (0.76)	3.10_{b} (0.94)	3.86^{*}	0.02
Spouse PSS	3.27_{a} (0.81)	3.38_{a} (0.65)	2.81_{b} (0.94)	2.84_{b} (0.86)	8.00^{***}	0.05
Spouse NSS	2.03_{b} (0.71)	2.06_{b} (0.69)	2.46_{a} (0.80)	2.38_{ab} (0.71)	6.55^{***}	0.04
Children PSS	3.48_{a} (0.56)	3.34_{a} (0.66)	3.25_{a} (0.78)	2.80_{b} (0.75)	11.42^{***}	0.07
Children NSS	1.54_{c} (0.53)	1.82_{b} (0.54)	1.71_{bc} (0.66)	2.17_{a} (0.70)	14.57^{***}	0.09
OFM PSS	3.06_{a} (0.80)	3.05_{a} (0.83)	2.91_{ab} (0.91)	2.51_{b} (0.87)	4.17^{**}	0.03
OFM NSS	1.45_{b} (0.53)	1.62_{b} (0.62)	1.58_{b} (0.51)	2.12_{a} (0.82)	12.84^{***}	0.08
Friends PSS	3.13 (0.69)	3.09 (0.73)	3.03 (0.64)	2.95 (0.79)	0.79	0.01
Friends NSS	1.28_{b} (0.39)	1.44_{a} (0.43)	1.60_{a} (0.68)	1.66_{a} (0.56)	12.52^{***}	0.08
Religious attendance	3.00_{a} (1.47)	2.88_{a} (1.36)	2.44_{a} (1.38)	2.45_{a} (1.59)	3.04^{*}	0.02
S Self-rated health	2.43_{a} (1.12)	2.29_{b} (1.16)	1.88_{b} (1.12)	1.86_{b} (1.03)	5.05^{**}	0.03
R Self-rated health	3.50_{a} (0.95)	2.87_{b} (1.08)	2.60_{bc} (1.27)	2.24_{c} (0.83)	26.16^{***}	0.15
Base depression	0.54_{c} (0.82)	1.24_{b} (1.04)	5.00_{a} (1.40)	5.17_{a} (1.39)	427.89^{***}	0.74
Post 1 depression	1.21_{c} (1.60)	4.14_{b} (2.29)	3.71_{b} (2.30)	5.59_{a} (2.08)	99.51^{***}	0.40
Post 2 depression	0.61_{d} (0.91)	4.14_{b} (1.80)	1.92_{c} (1.50)	5.61_{a} (1.50)	277.50^{***}	0.66
Post 3 depression	0.59_{d} (0.89)	3.41_{b} (1.98)	1.82_{c} (1.73)	5.40_{a} (1.96)	155.17^{***}	0.56

Note. ANOVAs = analyses of variance; PSS = positive social support; NSS = negative social support; OFM = other family members; S = spouse; R = respondent. Subscript letters a to d are used to indicate statistically significant differences among values based on the results of the Bonferroni post hoc test. Means that do not share subscripts differ by $p < .05$ according to Bonferroni post-hoc tests. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Comparison Among Continuously Married Adults with Distinct Depression Trajectories

Baseline differences among continuously married adults in four distinct trajectories were inspected using the χ^2 test for independence (Table 11) and a one-way ANOVA (Table 12). Except for gender, significant group differences were found on all the other categorical variables. Compared with adults in the other three groups, continuously married adults in the NDG and their spouse were less likely to report ADL impairment. Besides, the NDG adults were more likely to be White and in their first marriage, and less likely to be a caregiver of their spouse. As shown in Table 12, the ANOVA results indicate that there were significant group differences in all continuous variables except for the length of marriage. Similar to the results among widowed adults, the significant differences in depression scores of four waves among continuously married adults had η^2 values greater than 0.14, the cut-point for large effects suggested by Cohen (1988). All the other significant findings only had small or medium effect sizes. A series of Bonferroni post-hoc tests were performed to compare differences for each possible pair. Most group differences were found between the NDG and the other three groups. Not surprisingly, the depression scores of continuously married adults in the NDG were lowest at all four waves. Besides, adults in the NDG showed significantly higher values than adults in other groups on education, household income, closeness with the spouse, PSS from the spouse and children, self-rated health of spouse, and respondents' own self-rated health.

Sequential Multinomial Logistic Regression

Sequential multinomial logistic regressions were computed to identify demographic variables and contextual factors that can differentiate respondents in the NDG (reference group) from respondents in the other three depression trajectory groups (i.e., IDG, DDG, and CDG). For

Table 11

The Results of χ^2 Test for Independence among Continuously Married Adults with Four Distinct Depression Trajectories

	No Depression (n = 1,328)		Increasing Depression (n = 125)		Decreasing Depression (n = 100)		Chronic Depression (n = 58)		$\chi^2(3)$
	n	%	*n*	%	*n*	%	*n*	%	
Gender									4.73
Male	504	37.95%	41	32.80%	32	32.00%	16	27.59%	
Female	824	62.05%	84	67.20%	68	68.00%	42	72.41%	
Ethnicity									19.73***
Non-White	173	13.03%	33	26.40%	19	19.00%	12	20.69%	
White	1155	86.97%	92	73.60%	81	81.00%	46	79.31%	
First marriage									11.34*
No	373	28.09%	46	36.80%	27	27.00%	26	44.83%	
Yes	955	71.91%	79	63.20%	73	73.00%	32	55.17%	
Caregiver									24.57***
No	1212	91.27%	104	83.20%	82	82.00%	45	77.59%	
Yes	116	8.73%	21	16.80%	18	18.00%	13	22.41%	
S ADL impairment									15.24**
No	1213	91.34%	106	84.80%	83	83.00%	48	82.76%	
Yes	115	8.66%	19	15.20%	17	17.00%	10	17.24%	
R ADL impairment									145.63***
No	1266	95.33%	92	73.60%	84	84.00%	37	63.79%	
Yes	62	4.67%	33	26.40%	16	16.00%	21	36.21%	

Note. First marriage = Marriage at base wave was the first marriage; Caregiver = Respondent was spouse's caregiver at base wave; S = Spouse; R = Respondent. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Table 12

Means and Standard Deviations of Continuous Variables of Respondents in Four Continuously Married Groups and the Results of One-Way ANOVAS

	No Depression (n = 1,328)	Increasing Depression (n = 125)	Decreasing Depression (n = 100)	Chronic Depression (n = 58)	F (3, 462)	η^2
Age	64.22_a (9.11)	64.40_a (10.71)	62.03_a (9.20)	61.55_a (8.34)	3.21^*	0.01
Education	13.40_a (2.69)	11.90_b (3.65)	12.21_b (3.13)	11.53_b (3.36)	21.53^{***}	0.04
Household income	14.92_a (1.43)	14.35_b (1.29)	14.42_b (3.10)	14.23_b (1.11)	10.51^{***}	0.02
Marriage length	35.74 (14.39)	32.87 (16.95)	35.03 (12.91)	32.65 (12.30)	2.25	0.00
Closeness w/ Spouse	3.55_a (0.63)	3.33_b (0.78)	3.34_b (0.70)	3.07_b (0.93)	15.37^{***}	0.03
Spouse PSS	3.59_a (0.53)	3.37_b (0.61)	3.30_b (0.68)	2.91_c (0.79)	37.90^{***}	0.07
Spouse NSS	1.91_c (0.63)	2.12_b (0.65)	2.19_b (0.74)	2.47_a (0.66)	22.33^{***}	0.04
Children PSS	3.29_a (0.66)	3.03_b (0.75)	3.12_{ab} (0.73)	2.89_b (0.78)	12.86^{***}	0.02
Children NSS	1.71_c (0.58)	1.91_b (0.70)	1.90_b (0.62)	2.22_a (0.77)	19.43^{***}	0.03
OFM PSS	2.88_a (0.82)	2.83_a (0.83)	2.88_{ab} (0.82)	2.53_b (1.02)	3.31^*	0.01
OFM NSS	1.57_b (0.58)	1.92_a (0.73)	1.70_b (0.63)	2.07_a (0.77)	24.68^{***}	0.04
Friends PSS	3.07_a (0.72)	2.97_a (0.66)	2.94_a (0.83)	2.85_a (0.74)	3.13^*	0.01
Friends NSS	1.38_b (0.42)	1.63_a (0.63)	1.51_a (0.48)	1.56_a (0.48)	16.08^{***}	0.03
Religious attendance	3.06_a (1.43)	3.16_a (1.36)	2.75_{ab} (1.40)	2.16_b (1.25)	9.08^{***}	0.02
S Self-rated health	3.48_a (1.00)	3.09_b (1.06)	3.19_b (1.16)	3.03_b (0.95)	10.78^{***}	0.02
R Self-rated health	3.64_a (0.91)	2.74_{bc} (1.01)	2.85_b (1.04)	2.40_c (1.02)	81.69^{***}	0.13
Base depression	0.51_d (0.78)	1.69_c (1.01)	4.73_b (1.26)	5.90_a (1.49)	1389.58^{***}	0.72
Post 1 depression	0.58_d (1.01)	2.93_b (2.01)	2.19_c (1.77)	5.28_a (2.13)	422.41^{***}	0.44
Post 2 depression	0.46_d (0.77)	3.80_b (1.81)	1.84_c (1.49)	6.28_a (1.41)	1068.07^{***}	0.67
Post 3 depression	0.57_d (0.92)	3.32_b (2.08)	2.07_c (1.82)	5.07_a (2.09)	466.68^{***}	0.47

Note. ANOVAS = analyses of variance; PSS = positive social support; NSS = negative social support; OFM = other family members; S = spouse; R = respondent. Subscript letters a to d are used to indicate statistically significant differences among values based on the results of the Bonferroni post hoc test. Means that do not share subscripts differ by $p < .05$ according to Bonferroni post-hoc tests.
$^*p < .05$. $^{***}p < .001$.

both widowed and continuously married adults, a series of four nested models were performed: Model 1 examined the effects of demographic variables and religious attendance. Model 2 inspected the effects of variables related to marriage and spouse support in addition to the variables in Model 1. Model 3 investigated the effects of other sources of social support and relationship strain on the base of Model 2, and Model 4 examined the effects of health-related variables of respondents and their spouse in addition to the variables in Model 3.

Table 13 shows the likelihood ratio tests for the sequential multinomial logistic regressions among widowed adults and continuously married adults. Each of the four models showed statistically significant improvement in addition to the model computed before it (Model 1 was compared with Model 0, the intercept only null model), and this is true for both the widowed and the continuously married groups. The results of four nested models for each comparison pair are summarized in Table 14-19, with the results for widowed adults coming first followed by the results for continuously married adults.

Table 13

The Results of Likelihood Ratio Tests for the Sequential Multinomial Logistic Regressions among Widowed Adults (*n = 446) and Continuously Married Adults* (*n = 1611)*

	Widowed		*Continuously Married*	
	df	χ^2	df	χ^2
Model 0 vs. Model 1	18	41.49^{***}	18	115.43^{***}
Model 1 vs. Model 2	15	26.36^{*}	15	95.06^{***}
Model 2 vs. Model 3	18	65.23^{***}	18	68.71^{***}
Model 3 vs. Model 4	12	54.05^{***}	12	173.57^{***}

Note. Model 0 (null model, intercept only); Model 1 (demographic variables); Model2 (spouse-related variables + Model 1 Variables); Model3 Variables (social support variables + Model2 Variables); Model4 Variables (health-related variables of respondent's own and their spouse + Model3 Variables). The -2 Log-Likelihood of Model 0 for the widowed and the continuously married groups are 924.61 and 2093.65, respectively. $^{*}p < .05$. $^{***}p < .001$.

Increasing Depression Group (IDG) vs. No Depression Group (NDG)

As shown in Tables 14 and 15, respondents' functional limitations and self-rated health could significantly differentiate IDG adults from NDG adults for both the widowed and the continuously married groups. Adults with more ADL impairments and lower self-rated health were more likely in the IDG. NSS also plays a significant differentiating role for both widowed and continuously married adults. Both widowed and continuously married adults in the IDG were more likely to report higher NSS from children. For continuously married adults, adults in IDG were also more likely to report higher NSS from other family members and friends than adults in NDG (Table 15). Education could also differentiate continuously married adults in the IDG from the NDG, but its effect was attenuated when the health-related variables were added in the model.

Decreasing Depression Group (DDG) vs. No Depression Group (NDG)

The Results of four sequential MLR models for the comparison between the DDG and NDG are shown in Table 16 for widowed adults and in Table 17 for continuously married adults. Again, respondents' functional ADL limitations and self-rated health could significantly differentiate both widowed and continuously married adults in the DDG from the NDG. Adults with more ADL impairments and lower self-rated health were more likely in the DDG than in the NDG. Besides, the frequency of religious attendance could also differentiate DDG adults from NDG adults, but this is only true for widowed adults, not for continuously married adults. Compared with the widowed adults in the NDG, adults in the DDG were less likely to go to church frequently before the death of their spouse (Table 16). For continuously married adults, social support from the spouse played a significant differentiating role. Compared with adults in the NDG, adults in the DDG were more likely to report a lower PSS from the spouse at the

baseline (Table 17). Education could also differentiate widowed and continuously married adults in the DDG from the NDG, but its effect was attenuated and became not significant when the health-related variables were added in the model.

Chronic Depression Group (CDG) vs. No Depression Group (NDG)

The Results of four sequential MLR models for the comparison between the CDG and the NDG are shown in Table 18 for widowed adults and in Table 19 for continuously married adults. Once again, respondents' functional limitations and self-rated health could significantly differentiate the CDG from the NDG for both widowed and continuously married adults. Adults with more ADL impairments and lower self-rated health were more likely in the CDG than in the NDG. Except for these two health-related variables, no other variables significantly differentiated widowed adults in the CDG from the NDG. For continuously married adults, however, age, education level, frequency of religious attendance, marriage length, whether the marriage at the base wave was the first one, and PSS from the spouse can all significantly differentiate adults in the CDG from the NDG in addition to the effect of two health-related variables (Table 19). More specifically, compared with adults in the NDG, continuously married adults in the CDG are more likely to be younger, having fewer years of education, going to church less frequently, having longer marriage, and receiving lower PSS from their spouse. Adults in CDG were also more likely to report that their marriage at the baseline was not the first one. Finally, similar to the results of the previous analysis, the effect of education in differentiating continuously married adults in the CDG from the NDG was attenuated when health-related variables were added to the model.

Table 14

The Results of Sequential Multinomial Logistic Regression for the Comparison between the Increasing Depression Group (n = 91) and the No Depression Group (Reference Group, n = 278) among Widowed Adults

	Model 1		Model 2		Model 3		Model 4	
	B (SE)	Odds Ratio	B (SE)	Odds Ratio	B (SE)	Odds Ratio	B (SE)	Odds Ratio
Intercept	0.21 (1.54)		-1.57 (2.01)		-2.64 (2.26)		-2.28 (2.35)	
Age	0.01 (0.01)	1.01	0.00 (0.02)	1.00	0.01 (0.02)	1.01	0.00 (0.02)	1.00
Female	-0.01 (0.26)	0.99	0.03 (0.27)	1.03	0.17 (0.28)	1.18	0.24 (0.30)	1.27
White	-0.38 (0.33)	0.68	-0.37 (0.34)	0.69	-0.25 (0.36)	0.78	-0.06 (0.37)	0.94
Years of Education	-0.07 (0.05)	0.93	-0.07 (0.05)	0.93	-0.07 (0.05)	0.93	-0.03 (0.05)	0.97
Household Income	-0.02 (0.08)	0.98	-0.02 (0.08)	0.98	-0.02 (0.07)	0.98	0.00 (0.08)	1.00
Religious attendance	-0.11 (0.09)	0.90	-0.11 (0.09)	0.89	-0.12 (0.09)	0.89	-0.09 (0.10)	0.91
Marriage Length			0.01 (0.01)	1.01	0.02 (0.01)	1.02	0.02 (0.01)	1.02
First Marriage			-0.18 (0.41)	0.84	-0.36 (0.44)	0.70	-0.46 (0.45)	0.63
Closeness w/ spouse			0.17 (0.23)	1.18	0.12 (0.24)	1.13	0.11 (0.24)	1.11
Spouse PSS			0.27 (0.23)	1.31	0.21 (0.24)	1.23	0.24 (0.25)	1.27
Spouse NSS			0.25 (0.22)	1.29	-0.12 (0.25)	0.89	-0.17 (0.26)	0.85
Children PSS					-0.27 (0.25)	0.77	-0.17 (0.26)	0.84
Children NSS					0.85 (0.31)	2.33**	0.82 (0.32)	2.28**
OFM PSS					0.06 (0.18)	1.06	0.07 (0.18)	1.07
OFM NSS					-0.06 (0.29)	0.94	-0.07 (0.30)	0.93
Friends PSS					0.03 (0.20)	1.03	0.09 (0.21)	1.10
Friends NSS					0.54 (0.33)	1.72	0.53 (0.34)	1.70
S Self-rated health							-0.07 (0.12)	0.93
R Self-rated health							-0.42 (0.14)	0.66**
S ADL impairment							0.01 (0.30)	1.01
R ADL impairment							1.26 (0.41)	3.52**
-2 Log Likelihood	883.12		856.76		791.53		734.48	
Nagelkerke R^2	. 10		.16		.30		.39	

Note. First marriage = marriage at base wave was the first marriage; PSS = positive social support; NSS = negative social support; OFM = other family members; S = spouse; R = respondent. $^{**}p < .01$.

Table 15

The Results of Sequential Multinomial Logistic Regression for the Comparison between the Increasing Depression Group (n = 125) and the No Depression Group (Reference Group, n = 1,328) among Continuously Married Adults

	Model 1		Model 2		Model 3		Model 4	
	B (SE)	Odds Ratio	B (SE)	Odds Ratio	B (SE)	Odds Ratio	B (SE)	Odds Ratio
Intercept	1.43 (1.17)		1.66 (1.48)		0.54 (1.63)		2.25 (1.72)	
Age	0.00 (0.01)	1.00	0.01 (0.01)	1.01	0.03 (0.01)	1.03*	0.02 (0.01)	1.02
Female	0.26 (0.21)	1.30	0.27 (0.22)	1.30	0.47 (0.23)	1.59*	0.47 (0.24)	1.60
White	-0.45 (0.25)	0.64	-0.32 (0.25)	0.73	-0.17 (0.26)	0.85	0.18 (0.28)	1.19
Years of Education	-0.13 (0.03)	0.88***	-0.13 (0.03)	0.88***	-0.13 (0.03)	0.87***	-0.10 (0.04)	0.91*
Household Income	-0.12 (0.06)	0.89*	-0.11 (0.06)	0.90*	-0.11 (0.06)	0.90	-0.05 (0.07)	0.95
Religious attendance	0.02 (0.07)	1.02	0.04 (0.07)	1.04	0.06 (0.07)	1.06	0.08 (0.08)	1.09
Marriage Length			-0.02 (0.01)	0.98	-0.02 (0.01)	0.98	-0.02 (0.01)	0.98
First Marriage			-0.08 (0.31)	0.92	0.04 (0.32)	1.04	0.11 (0.33)	1.12
Closeness w/ spouse			-0.14 (0.18)	0.87	-0.21 (0.18)	0.81	-0.26 (0.19)	0.77
Spouse PSS			-0.26 (0.21)	0.77	-0.23 (0.22)	0.80	-0.25 (0.23)	0.78
Spouse NSS			0.24 (0.17)	1.27	-0.03 (0.19)	0.97	0.02 (0.20)	1.02
Children PSS					-0.61 (0.16)	0.54***	-0.63 (0.17)	0.53***
Children NSS					-0.25 (0.20)	0.78	-0.50 (0.22)	0.61*
OFM PSS					0.23 (0.14)	1.26	0.29 (0.15)	1.34
OFM NSS					0.67 (0.18)	1.96***	0.75 (0.19)	2.11***
Friends PSS					-0.05 (0.15)	0.95	0.00 (0.16)	1.00
Friends NSS					0.64 (0.22)	1.89**	0.58 (0.23)	1.78**
S Self-rated health							-0.04 (0.11)	0.96
R Self-rated health							-0.75 (0.12)	0.47***
S ADL impairment							-0.03 (0.33)	0.97
R ADL impairment							1.31 (0.28)	3.72***
-2 Log Likelihood	1978.23		1883.17		1814.46		1640.90	
Nagelkerke R^2	. 10		.17		.22		.34	

Note. First marriage = marriage at base wave was the first marriage; PSS = positive social support; NSS = negative social support; OFM = other family members; S = spouse; R = respondent. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Table 16

The Results of Sequential Multinomial Logistic Regression for the Comparison between the Decreasing Depression Group (*n = 48) and the No Depression Group* (*Reference Group, n = 278) among Widowed Adults.*

	Model 1		Model 2		Model 3		Model 4	
	B (SE)	Odds Ratio	B (SE)	Odds Ratio	B (SE)	Odds Ratio	B (SE)	Odds Ratio
Intercept	3.57 (1.73)		1.90 (2.37)		1.96 (2.79)		3.34 (3.01)	
Age	-0.03 (0.02)	0.97	-0.02 (0.02)	0.98	-0.02 (0.03)	0.98	-0.03 (0.03)	0.97
Female	0.55 (0.38)	1.73	0.41 (0.39)	1.50	0.60 (0.42)	1.83	0.74 (0.44)	2.09
White	-0.53 (0.43)	0.59	-0.37 (0.44)	0.69	-0.46 (0.47)	0.63	-0.11 (0.50)	0.89
Years of Education	-0.12 (0.06)	0.89*	-0.13 (0.06)	0.88*	-0.14 (0.06)	0.87*	-0.09 (0.07)	0.91
Household Income	-0.07 (0.08)	0.93	-0.02 (0.08)	0.98	0.00 (0.08)	1.00	0.03 (0.09)	1.03
Religious attendance	-0.36 (0.12)	0.70**	-0.34 (0.12)	0.71**	-0.40 (0.13)	0.67**	-0.35 (0.14)	0.70*
Marriage Length			-0.01 (0.02)	0.99	0.00 (0.02)	1.00	0.00 (0.02)	1.00
First Marriage			-0.32 (0.49)	0.72	-0.47 (0.52)	0.62	-0.59 (0.56)	0.55
Closeness w/ spouse			0.27 (0.27)	1.31	0.26 (0.29)	1.30	0.13 (0.30)	1.14
Spouse PSS			-0.46 (0.25)	0.63	-0.45 (0.26)	0.63	-0.41 (0.28)	0.66
Spouse NSS			0.58 (0.28)	1.79*	0.52 (0.32)	1.68	0.37 (0.34)	1.44
Children PSS					-0.45 (0.32)	0.64	-0.28 (0.33)	0.76
Children NSS					0.06 (0.41)	1.06	0.12 (0.43)	1.12
OFM PSS					-0.01 (0.23)	0.99	0.04 (0.24)	1.04
OFM NSS					-0.63 (0.40)	0.54	-0.67 (0.42)	0.51
Friends PSS					0.15 (0.27)	1.16	0.16 (0.29)	1.17
Friends NSS					1.32 (0.38)	3.76***	1.27 (0.40)	3.57**
S Self-rated health							-0.22 (0.18)	0.80
R Self-rated health							-0.65 (0.20)	0.52**
S ADL impairment							0.35 (0.41)	1.41
R ADL impairment							0.97 (0.52)	2.63†
-2 Log Likelihood	883.12		856.76		791.53		734.48	
Nagelkerke R^2	. 10		.16		.30		.39	

Note. First marriage = marriage at base wave was the first marriage; PSS = positive social support; NSS = negative social support; OFM = other family members; S = spouse; R = respondent. $^{\dagger}p = .063$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Table 17

The Results of Sequential Multinomial Logistic Regression for the Comparison between the Decreasing Depression Group (*n = 100) and the No Depression Group* (*Reference Group, n = 1,328) among Continuously Married Adults*

	Model 1		Model 2		Model 3		Model 4	
	B (SE)	Odds Ratio	B (SE)	Odds Ratio	B (SE)	Odds Ratio	B (SE)	Odds Ratio
Intercept	3.33 (1.25)		3.94 (1.62)		3.52 (1.73)		4.70 (1.79)	
Age	-0.03 (0.01)	0.97*	-0.04 (0.02)	0.96	-0.04 (0.02)	0.96*	-0.05 (0.02)	0.95*
Female	0.22 (0.23)	1.25	0.10 (0.24)	1.11	0.20 (0.25)	1.23	0.25 (0.25)	1.28
White	-0.02 (0.30)	0.98	0.02 (0.31)	1.02	0.10 (0.31)	1.11	0.42 (0.32)	1.53
Years of Education	-0.13 (0.04)	0.88**	-0.12 (0.04)	0.89**	-0.12 (0.04)	0.89**	-0.08 (0.04)	0.92†
Household Income	-0.13 (0.06)	0.87*	-0.12 (0.06)	0.89*	-0.11 (0.06)	0.90*	-0.06 (0.06)	0.94
Religious attendance	-0.14 (0.08)	0.87	-0.15 (0.08)	0.86	-0.15 (0.08)	0.86	-0.12 (0.08)	0.88
Marriage Length			0.02 (0.02)	1.02	0.02 (0.02)	1.02	0.02 (0.02)	1.02
First Marriage			-0.19 (0.35)	0.83	-0.19 (0.36)	0.82	-0.21 (0.37)	0.81
Closeness w/ spouse			0.13 (0.20)	1.14	0.09 (0.20)	1.10	0.08 (0.20)	1.08
Spouse PSS			-0.56 (0.23)	0.57*	-0.54 (0.24)	0.59*	-0.56 (0.24)	0.57*
Spouse NSS			0.40 (0.18)	1.49*	0.30 (0.21)	1.35	0.37 (0.21)	1.44
Children PSS					-0.26 (0.19)	0.77	-0.22 (0.20)	0.80
Children NSS					0.10 (0.22)	1.11	-0.04 (0.23)	0.96
OFM PSS					0.25 (0.16)	1.29	0.29 (0.16)	1.34
OFM NSS					0.05 (0.22)	1.05	0.03 (0.23)	1.03
Friends PSS					-0.19 (0.16)	0.83	-0.15 (0.17)	0.86
Friends NSS					0.33 (0.26)	1.39	0.27 (0.26)	1.31
S Self-rated health							0.06 (0.12)	1.06
R Self-rated health							-0.78 (0.13)	0.46***
S ADL impairment							0.34 (0.33)	1.40
R ADL impairment							0.81 (0.34)	2.25*
-2 Log Likelihood	1978.23		1883.17		1814.46		1640.90	
Nagelkerke R^2	. 10		.17		.22		.34	

Note. First marriage = marriage at base wave was the first marriage; PSS = positive social support; NSS = negative social support; OFM = other family members; S = spouse; R = respondent. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Table 18

The Results of Sequential Multinomial Logistic Regression for the Comparison between the Chronic Depression Group (*n = 29) and the No Depression Group* (*Reference Group, n = 278) among Widowed Adults*

	Model 1		Model 2		Model 3		Model 4	
	B (SE)	Odds Ratio	B (SE)	Odds Ratio	B (SE)	Odds Ratio	B (SE)	Odds Ratio
Intercept	3.95 (1.96)		4.95 (2.82)		4.49 (3.34)		6.01 (3.60)	
Age	-0.04 (0.02)	0.96	-0.05 (0.03)	0.95	-0.02 (0.03)	0.98	-0.02 (0.04)	0.98
Female	0.58 (0.49)	1.79	0.41 (0.50)	1.51	0.72 (0.54)	2.06	0.94 (0.57)	2.57
White	-0.31 (0.55)	0.73	-0.21 (0.56)	0.81	-0.12 (0.61)	0.89	0.22 (0.66)	1.25
Years of Education	-0.06 (0.08)	0.94	-0.06 (0.08)	0.94	-0.11 (0.08)	0.89	-0.05 (0.09)	0.96
Household Income	-0.13 (0.08)	0.88	-0.10 (0.07)	0.90	-0.11 (0.07)	0.90	-0.08 (0.07)	0.92
Religious attendance	-0.34 (0.15)	0.71*	-0.33 (0.15)	0.72*	-0.24 (0.17)	0.79	-0.21 (0.18)	0.81
Marriage Length			0.01 (0.02)	1.01	0.02 (0.03)	1.02	0.02 (0.03)	1.02
First Marriage			-0.75 (0.61)	0.47	-0.68 (0.72)	0.51	-0.75 (0.77)	0.47
Closeness w/ spouse			-0.09 (0.33)	0.91	-0.33 (0.37)	0.72	-0.37 (0.40)	0.69
Spouse PSS			-0.33 (0.31)	0.72	-0.25 (0.37)	0.78	-0.21 (0.39)	0.81
Spouse NSS			0.27 (0.35)	1.31	-0.31 (0.43)	0.74	-0.43 (0.47)	0.65
Children PSS					-0.78 (0.37)	0.46**	-0.59 (0.37)	0.55
Children NSS					0.79 (0.47)	2.21	0.86 (0.51)	2.37
OFM PSS					-0.32 (0.31)	0.73	-0.27 (0.32)	0.77
OFM NSS					0.62 (0.40)	1.86	0.48 (0.44)	1.61
Friends PSS					-0.13 (0.33)	0.87	-0.19 (0.35)	0.83
Friends NSS					0.70 (0.46)	2.01	0.59 (0.51)	1.80
S Self-rated health							-0.31 (0.26)	0.73
R Self-rated health							-0.80 (0.28)	0.45**
S ADL impairment							0.02 (0.56)	1.02
R ADL impairment							1.34 (0.64)	3.80*
-2 Log Likelihood	883.12		856.76		791.53		734.48	
Nagelkerke R^2	. 10		.16		.30		.39	

Note. First marriage = marriage at base wave was the first marriage; PSS = positive social support; NSS = negative social support; OFM = other family members; S = spouse; R = respondent. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Table 19

The Results of Sequential Multinomial Logistic Regression for the Comparison between the Chronic Depression Group (*n = 58) and the No Depression Group* (*Reference Group, n = 1,328) among Continuously Married Adults*

	Model 1		Model 2		Model 3		Model 4	
	B (SE)	Odds Ratio	B (SE)	Odds Ratio	B (SE)	Odds Ratio	B (SE)	Odds Ratio
Intercept	4.25 (1.51)		6.40 (1.97)		4.87 (2.16)		6.72 (2.39)	
Age	-0.03 (0.02)	0.97	-0.05 (0.02)	0.95*	-0.03 (0.02)	0.97	-0.06 (0.03)	0.94*
Female	0.57 (0.32)	1.76	0.24 (0.34)	1.27	0.44 (0.36)	1.55	0.47 (0.38)	1.59
White	0.00 (0.42)	1.00	-0.10 (0.43)	0.90	0.06 (0.45)	1.06	0.54 (0.46)	1.72
Years of Education	-0.19 (0.05)	0.83***	-0.17 (0.05)	0.85**	-0.17 (0.05)	0.84***	-0.11 (0.06)	0.90†
Household Income	-0.15 (0.07)	0.86*	-0.14 (0.07)	0.87*	-0.12 (0.07)	0.88	-0.09 (0.08)	0.92
Religious attendance	-0.48 (0.11)	0.62***	-0.51 (0.12)	0.60***	-0.48 (0.12)	0.62***	-0.46 (0.13)	0.63***
Marriage Length			0.04 (0.02)	1.04*	0.03 (0.02)	1.03	0.04 (0.02)	1.04*
First Marriage			-1.33 (0.42)	0.27**	-1.10 (0.44)	0.33*	-1.14 (0.47)	0.32*
Closeness w/ spouse			0.31 (0.24)	1.36	0.27 (0.25)	1.32	0.15 (0.27)	1.16
Spouse PSS			-1.23 (0.27)	0.29***	-1.27 (0.30)	0.28***	-1.34 (0.32)	0.26***
Spouse NSS			0.68 (0.24)	1.97**	0.29 (0.27)	1.34	0.37 (0.29)	1.45
Children PSS					-0.04 (0.25)	0.96	0.04 (0.27)	1.04
Children NSS					0.55 (0.28)	1.74	0.36 (0.31)	1.44
OFM PSS					-0.07 (0.20)	0.93	0.00 (0.21)	1.00
OFM NSS					0.55 (0.26)	1.73*	0.50 (0.29)	1.65
Friends PSS					-0.12 (0.21)	0.89	0.11 (0.23)	1.11
Friends NSS					-0.11 (0.33)	0.89	-0.10 (0.35)	0.90
S Self-rated health							0.12 (0.17)	1.13
R Self-rated health							-1.05 (0.18)	0.35***
S ADL impairment							-0.08 (0.48)	0.93
R ADL impairment							1.82 (0.39)	6.20***
-2 Log Likelihood	1978.23		1883.17		1814.46		1640.90	
Nagelkerke R^2	. 10		.17		.22		.34	

Note. First marriage = marriage at base wave was the first marriage; PSS = positive social support; NSS = negative social support; OFM = other family members; S = spouse; R = respondent. †$p = .054$. *$p < .05$. **$p < .01$. ***$p < .001$.

CHAPTER 5
DISCUSSION

The death of a spouse is considered one of the most stressful experiences in life (Dohrenwend et al., 1978; Holmes & Rahe, 1967), and for many people, it is the core experience of aging. One of the most common psychological disorders after spousal bereavement is depression (Cole & Dendukuri, 2003; Schaan, 2013; Shor et al., 2012; Umberson et al., 1992; Williams & Umberson, 2004). The changes of depression level in the transition to widowhood are influenced by a wide range of factors, including the demographic characteristics of the surviving spouse, such as gender, age, ethnicity, economic and educational background, as well as pre-loss health conditions, social support, and variables related to the characteristics of the marriage.

In this study, I first explored the possible trajectories of depression in the transition to widowhood. The hypothesis that heterogeneity exists in the adjustment to the death of a spouse was supported by the study, and four distinct depression trajectories in widowhood were identified. Then, I examined the effects of socio-demographic variables on the membership of various trajectory groups. Since the hypotheses on the impact of these variables were developed based on a limited number of studies, not all the hypotheses were supported by the results of this study. Except for education level, all the other demographic variables could not differentiate widowed adults with different depression trajectories. Finally, I analyzed how the depression trajectories were affected by pre-loss contextual factors such as physical health and function limitations, religious attendance, and positive and negative social support from various sources. The findings supported the hypothesis that both health status and social support could significantly differentiate widowed adults with distinct depression trajectories. In the following sections, I will discuss the main findings.

Depression Trajectories

Losing a spouse to death is usually a harrowing experience, but individuals vary significantly in the degree and duration of grief. Based on previous research that documented the heterogeneity in the adjustments and outcomes of spousal loss (Galatzer-Levy & Bonanno, 2012; Lotterman et al., 2014; Maccallum et al., 2015), I hypothesized that there would be multiple distinct trajectories of depression scores in the transition to widowhood. This hypothesis was supported by the results of the latent class growth analysis in this study. Four groups of adults with distinct depression trajectories in the transition to widowhood were identified.

No Depression Group (NDG)

The majority of widowed individuals show a depression trajectory characterized by no depression at baseline, a slight increase in depression after the loss of the spouse, and a relatively quick return to the baseline state. Although psychological interference might appear in the short period after the loss, these psychological problems usually resolve over time for widowed adults in the NDG. Consistent with previous studies (Bonanno et al., 2004; Maccallum et al., 2015; Wolff & Wortman, 2005), the study found that adults in the NDG showed resilience after the death of their spouse. They did not show a long-term increase in depression scores that affected daily function, or a long-standing and persistent sadness response, immersed in grief. In general, there is a higher percentage of widowed adults in the NDG who are in advantaged social groups (e.g., male, White). The spouse of these adults tended to have higher self-rated health scores and a lower chance of ADL impairment. Hence, the adults in the NDG were less likely to be a caregiver of their spouse at baseline. The marriage of these adults at baseline was more likely to be their first one. Besides, these adults were more likely to be older, had higher education levels

and household income, had a closer relationship with their spouse, reported high PSS and low NSS from various resources, and reported better health and functioning.

Increasing Depression Group (IDG)

The second group of widowed adults had a depression trajectory characterized as low depression at baseline, significantly elevated depression after the death of a spouse, and remained at a high level of depression ever since. The immediate psychological effects of spousal death are usually severe, and there might be significant mental problems right after the bereavement. For most people, such as adults in the NDG, psychological distress often resolved over time. However, for adults in the IDG, the impact of widowhood on emotional health will continue. This group of widowed adults has also been found in previous studies (Bonanno et al., 2004; Maccallum et al., 2015; Wolff & Wortman, 2005). Widowed adults in the IDG might represent a grief group of people who are vulnerable to prolonged grief disorder and in need of professional assistance. There were no differences in predicting variables between adults in the IDG and NDG except for two aspects: social support and health. On variables related to social support, adults in the IDG had significantly higher NSS from children and friends than adults in the NDG. On health-related variables, adults in the IDG reported lower self-rated health and higher rates of ADL impairment than adults in the NDG. Besides, the spouse of adults in the IDG also reported slightly lower self-rated health than did the spouse of adults in the NDG.

Decreasing Depression Group (DDG)

The third subgroup of widowed adults displays a recovery trend with an eventual return to the low depression from a higher level of depression at baseline. The main characteristic of individuals in this group was that adults in the DDG showed a high level of pre-loss depression, but their depression scores decreased significantly right after the death of their spouse and

continued to decline. The results show that adults in the DDG reported significantly lower PSS and higher NSS from their spouse compared with adults in the NDG. Besides, the spouse of the adults in the DDG reported lower self-rated health and was more likely to report ADL impairment than the spouse of adults in the NDG. The pattern of changes in depression levels of adults in the DDG suggests that the death of a spouse may mean the end of the source of chronic stresses that are either due to an unsatisfactory marriage or stressful caregiving burden (Adelman et al., 2014; Clyburn et al., 2000).

Chronic Depression Group (CDG)

The smallest subgroup of widowed adults showed a long-lasting high depression trajectory, characterized as an elevated level of depression throughout the whole observed period. Whereas it is understandable that adults in the CDG exist in any demographic group, the results show that there is a higher percentage of adults in the CDG among widowed adults than continuously married adults. Hence, it is crucial to have a better understanding of the profile of adults in the CDG. At first glance, the main difference between adults in the IDG and CDG is the level of depression before the death of the spouse. Individuals in the IDG experienced painful reactions from the death of a spouse, and their depression trajectory represented maladjustment to widowhood, but their depression score before bereavement was either only slightly elevated or at a very low level. By contrast, individuals in the CDG had been experiencing more persistent emotional difficulties before the death of their spouse. However, there were also other significant differences between adults in these two groups. For example, adults in the CDG reported lower self-rated health and higher rates of ADL impairment, had a less close relationship with their spouse, reported lower PSS from their spouse, children, and other family members, and reported higher NSS from their children and other family members than did adults in the IDG.

Set-Point Theory and Depression Trajectories

Set-point theory is commonly applied in the research of subjective well-being (Headey, 2010; Luhmann & Intelisano, 2018). According to this theory, the balance and stability of one's subjective well-being may be briefly interrupted after experiencing major life events, such as the death of a spouse, but the interruptions are usually temporary and do not have a long-term effect. Most adults can adapt to the new situation, and their subjective well-being usually returns to the baseline. However, the set-point theory has rarely been applied to the study of depression trajectories in the transition to widowhood. The findings of this study show that whereas set-point theory may apply to many widowed adults on depression level, such as those in the NDG, it might not be applicable to widowed adults with other depression trajectories. Take widowed adults in the IDG as an example, their depression symptoms increased after the spousal loss, as predicted by the set-point theory, but the level of depression remained high rather than went back to pre-loss levels. For the IDG widowed adults, losing a spouse to death seemed to have had a lasting effect on their depression level.

Age Differences

According to the life course perspective, the timing of life events may affect the meaning, consequences, and implications of the events (George, 2013). Hence, when an individual became widowed may affect the adjustment and outcomes of widowhood. Based on the findings from previous studies (Bonanno et al., 2004; Liechtenstein et al., 1996; Nolen-Hoeksema & Ahrens, 2002; Zisook et al., 1993), I had hypothesized that older adults might tend to experience less intense and fewer lasting symptoms of grief after losing a spouse. The results of this study do not support this hypothesis. Although continuously married adults were more likely to be in the NDG than in the DDG or CDG, this finding did not apply to the widowed adults. Among

widowed adults, there were overall age differences across four distinct depression trajectories, but the post-hoc test shows no significant differences between each pair. Besides, the MLR model shows that age could not differentiate widowed adults with different depression trajectories.

One possible reason why my findings are inconsistent with the results from previous studies is that most previous studies examined the short-term effects of widowhood on individuals. Losing a spouse to death is less expected for adults younger than 65 years old, and the impact on them is likely to be greater. However, the younger widowed adults have some advantages over older widowed adults, especially in the long run. For example, younger widowed adults are more likely to remarry than are their older counterparts, thus making up for the lack of social support caused by the loss of a spouse. Besides, young widowed adults usually have more social roles and, therefore, a relatively more extensive social support network. Finally, the financial difficulties after bereavement are also major causes of emotional problems in widowhood, and young widows might be better able to deal with financial strains.

Another possible explanation might be due to the selection effect due to widowhood. A meta-analysis showed that widowed older adults have an 11% higher risk of death compared with their married counterparts (Manzoli et al., 2007). It is possible that older adults might experience more negative effects than younger adults in widowhood, and they were more likely to die after the death of a spouse. Since this study does not include adults who had passed away a couple of years after the death of their spouse, the current study is not able to test this hypothesis.

Gender Differences

Whether there are gender differences in the adaptation and outcomes of widowhood has typically been a focus of bereavement research (Bennett et al., 2005; Carr, 2004; Lee et al., 1998;

Perrig-Chiello et al., 2016; Umberson et al., 1992; Williams, 2003). However, previous studies have not come to a definite conclusion on this issue. Besides, most previous studies have focused on gender differences in depression levels at a specific point after bereavement, and few studies have examined gender differences in the depression trajectories over a more extended period in the transition to widowhood. Based on limited findings from previous studies, this study hypothesized that women are more likely to be in the IDG or CDG. However, this hypothesis was not supported by the findings of this study. Gender did not play a significant role in distinguishing depression trajectories after the death of a spouse.

Although somehow surprising, the results are consistent with the findings from a couple of recent studies that have found no significant gender difference in depression levels after bereavement (Sasson & Umberson, 2014; Schaan, 2013). Some scholars assert that the experience of losing a spouse is universal between two gender groups (Sasson & Umberson, 2014), at least at the emotional level. Hence, although there may be some gender differences in the responses to psychometric scales or questionnaires between widows and widowers (Bennett et al., 2005), there may be no real difference in the level of depression between two gender groups.

Ethnic Differences

I hypothesized that individuals of ethnic minorities would be more likely to report more depressive symptoms in the transition to widowed. The results of this study did not support this hypothesis. Although there appeared to be a higher percentage of widowed Caucasian adults in the NDG than in the other three groups, the result of the χ^2 test for independence shows that the overall comparison is not significant. Besides, ethnicity did not differentiate adults in the NDG from adults in any other of the three trajectory groups for both widowed and continuously

married adults. Consistent with previous studies (Kessler et al., 1999; Oquendo et al., 2001), the results suggest that there may be no ethnic difference in depression trajectory after bereavement. However, there may be two other possible explanations for the findings. First, there are only a minimal number of African Americans and Latinos in the widowed group, and I had to combine these two groups for the purpose of statistical analysis. The limitation in sample size may prevent the findings of significant ethnic differences. Second, adults in different ethnic groups may respond differently to a depression screening scale. For example, Riolo et al. (2005) found that African Americans and Latinos have higher lifetime prevalence rates of dysthymic disorder, whereas Caucasians have higher lifetime prevalence rates of major depressive disorder. The CES-D scale used in this study could not differentiate the differences between these two disorders.

The Effects of SES

According to the stress exposure and vulnerability hypothesis, the mechanism linking stressful life events and declining physical and mental health lies in the frequency and intensity of stress exposure and related emotional and physiological responses (Kessler, 1979). Individuals from different social groups have differential stress exposure and susceptibility (Adler & Matthews, 1994; George & Lynch, 2003; Matthews et al., 2010; Turner & Avison, 2003). Generally, higher SES has been consistently found as a protective factor of physical health and mental well-being, but the number of studies regarding the effects of SES on one's physical and mental health after bereavement is limited. Based on the consistent findings in previous studies that higher SES has a protective effect on the physical and psychological health of the general population (Adler et al., 1994; Adler & Ostrove, 1998; Berkman, 2009; Cohen et al., 2010; Lorant et al., 2003), I hypothesized that higher SES also has a protective effect on widowed

adults. The findings of this study support this hypothesis. Adults in the NDG reported significantly higher education levels and higher household income than adults in both the DDG and CDG. Besides, education level can significantly differentiate adults in the NDG from adults in either the DDG or CDG, and this is true for both widowed and continuously married adults. However, the differentiating effect of education level on trajectories was attenuated or became non-significant once the health-related variables were added into the MLR models. This finding seems to suggest that the effect of education level on one's depression trajectory may be mediated by one's health status. In other words, individuals with a higher level of education are more likely to report better health and function, as reflected by a higher self-rated health and a lower chance to have ADL impairment, and it is the better health that helps individuals remain in a more favorable depression trajectory.

The Effects of Health and Functioning

A strong association was observed in previous research between the level of depression and one's physical health status (Alpass & Neville, 2003; Moussavi et al., 2007; Musselman et al., 1998). However, the effect of pre-loss health functioning on later depression trajectories has been less studied. This study found that health functioning is one of the most salient factors to distinguish bereaved adults with distinct depression trajectories in the transition to widowhood. Consisted with previous studies (Utz et al., 2012), the results show that those with ADL impairment or self-reported declining health before the loss of spouse had significantly higher risks of being in the IDG. The finding is not difficult to understand. One of the main challenges of life in widowhood is to assume the family responsibilities that would otherwise be borne by or shared with a deceased spouse. In this situation, declining health could be a physical obstacle for older widowed adults to achieve instrumental independence.

However, there is no conclusive evidence that declining health is the dominant cause of elevated and chronic depression levels among widowed adults. It is very likely that both deteriorating health and increased psychological distress are due to the maladaptation to widowhood. As shown in previous studies (Stroebe et al., 2007; Stroebe & Stroebe, 1987), widowhood is not only known as a risk factor for poor mental health but also often has a negative impact on individuals' efforts and attempts to maintain a healthy life.

One explanation for the mechanism of mental and physical health changes after spousal bereavement is the loss of support from the deceased spouse. Mounting evidence has shown that relationships are essential to health, independent of a person's marital status (Cohen, 2004; Cohen & Syme, 1985; Cohen & Wills, 1985; Cutrona & Russell, 1990; Fisher et al., 2014; Kessler et al., 1985). Marriage is often seen as a basis for emotional and instrumental support (Cutrona, 1996) and can also integrate people into broader social networks. According to the life course perspective, one's life is shaped by others through the interdependence created by human relationships (George, 2013). Marriage and the dissolution of marriage exemplify the importance of linked lives. Bereavement not only marks the death of the spouse, the main source of support, it can also cause major changes in the wider social network (Wolff & Wortman, 2005). Therefore, the social changes of bereavement have an impact on both physical and psychological health.

Relationship with Spouse

Although a closer relationship with the spouse is often found to be negatively associated with depression levels in the general population, this seems not always to be true among widowed adults. For example, Carr and colleagues (Carr & Boerner, 2009; Carr et al., 2000) demonstrated that people who reported higher marital quality were more likely to experience

higher levels of negative psychological consequences after their spouse died. Besides, Schaan (2013) found that widowed adults who reported higher marital quality showed a larger increase in the number of symptoms of depression, compared with those who reported lower marital quality at baseline.

Based on findings from previous studies, I had hypothesized that a closer relationship with a spouse would be associated with a higher chance of developing an increasing depression trajectory after losing the spouse, but this hypothesis was not explicitly supported by the findings of the study. The results show that widowed adults in the IDG did report the highest closeness score with their spouse at the baseline, but the closeness score was not significantly higher than that of widowed adults in the NDG or DDG. Besides, neither closeness with the spouse nor social support from the spouse was differentiating widowed adults in the IDG from the NDG.

There may be two reasons that the results of the current study are not consistent with the findings in previous studies. First, many of those studies were cross-sectional, and they examined the effects of pre-loss closeness with a spouse and marital satisfaction on depression level at a specific time point instead of the changes of the depression scores (Carr & Boerner, 2009; Carr et al., 2000; Schaan, 2013). Second, the effect of spousal loss on the level of depression depends not only on the degree of closeness with the spouse or the degree of satisfaction with the marriage, but also on other critical factors, such as one's health status and social support from various sources.

I had also hypothesized that a negative relationship with the spouse at baseline would lead to a decreasing depression trajectory in the transition to widowhood, and this hypothesis was supported by the study. The results show a statistical trend that widowed adults in the DDG reported lower closeness scores with the spouse than did widowed adults in the NDG. Besides,

widowed adults in the DDG reported the lowest PSS and the highest NSS from their spouse among widowed adults in all four trajectory groups. Finally, the MLR models show that both PSS and NSS can significantly differentiate widowed adults in the DDG from the NDG, although the significance disappeared after social support from other sources and health status variables were added into the model.

Social Support of Other Sources

Based on previous research that highlights the importance of social support in maintaining good physical health and mental well-being, I hypothesized that adults with high PSS and low NSS would be more likely to be classified in the NDG. This hypothesis was supported by the results of this study. Among all widowed adults, adults in the NDG consistently reported the highest PSS and lowest NSS from children, other family members, and friends. A close examination shows that there are no significant differences in PSS and NSS from various sources between adults in the NDG and IDG, except in NSS from children. Widowed adults in the IDG reported significantly higher NSS from children than did adults in the NDG, highlighting NSS from children as an important factor in preventing widowed adults from falling into the IDG. Besides, adults in the DDG and CDG tended to report relatively lower PSS and relatively higher NSS from various sources, compared with adults in the NDG.

The results of the current study also point out two noteworthy findings about the effect of social support on depression. First, the impact of NSS from one specific source on depressive symptoms outweighed that of PSS from the same source for both widowed and continuously married adults. The correlation matrix shows that depression scores at all four waves have stronger associations with NSS variables than with PSS variables. Besides, the results of the

MLR models show that NSS variables are more likely than PSS variables to significantly differentiate adults across four depression trajectory groups.

Second, there seem to be differential effects of NSS variables on depression among widowed and continuously married adults. The results show that the relationships of NSS variables with depressive symptoms are stronger among widowed adults than among continuously married adults. This finding indicates NSS might have a stronger impact on depression among widowed adults, those who experienced greater loss, than for adults who remained married.

Religious Attendance

I had hypothesized that more frequent religious attendance would be associated with a more desirable depression trajectory (i.e., NDG). The findings of this study did not explicitly support this hypothesis. Whereas there were overall significant differences among widowed adults with four distinct depression trajectories, the post-hoc test did not show significant differences for each comparison pair. The results of the MLR models show that religious attendance can differentiate adults in the NDG from adults in the DDG and CDG. However, their differentiating effects were attenuated or became not significant when variables related to social support and health status were added to the models. Besides, although adults in the NDG did attend church slightly more frequently than adults in the DDG, the differences were not significant, and the depression scores of adults in the DDG eventually returned to a much lower level. In addition, adults in the NDG and IDG attended church with similar frequency, but adults in the IDG showed an increasing depression trajectory. Hence, no definite conclusion may be drawn based on the findings of the current study as to whether high religious participation had a positive effect on depression trajectories when individuals lost their spouse.

There is currently not much research on the effects of religious attendance or religious beliefs on depression in widowhood, and some studies have given mixed conclusions. For example, a study demonstrated that stronger religious participation before loss helped individuals resolve their grief over time (Walsh et al., 2002). Other studies have shown that although religion has some benefits in helping individuals cope with bereavement experiences, such as enhancing their self-esteem and decreasing the grief, it does not reduce the level of depression (Brown et al., 2004; Sherkat & Reed, 1992).

Comparison between Widowed and Continuously Married Adults

Whereas the focus of this study is on widowed adults, continuously married adults were included in the analysis as a comparison group. The comparison between widowed adults and continuously married adults show distinct group differences. Compared to continuously married adults, widowed adults were more likely to be older, female, non-White, and with lower socioeconomic status and worse health conditions. Furthermore, the widowed adults were less close with their spouse at baseline, and they reported lower scores on positive and higher scores on negative social support from various resources.

In terms of depression trajectories, most studies have shown three to five trajectories for most populations (Galatzer-Levy & Bonanno, 2012; Kaup et al., 2016; Kuchibhatla et al., 2012; Maccallum et al., 2015). In this study, I adopted a 4-class model on depression trajectories over time for both widowed and continuously married adults. The findings show that the proportion of adults in four depression trajectories differ significantly between these two groups of adults. Compared with continuously married adults, widowed adults were significantly less likely to be in the NDG (82.4% vs. 62.3%).

Health-related variables (i.e., self-rated health and ADL impairment) and social support variables were significant in differentiating adults with different depression trajectories, and it is true for both widowed and continuously married adults. On the other hand, age was only found significant in differentiating continuously married adults with different depression trajectories. This finding indicates the depression trajectories of widowed adults were less likely to be affected by the demographic variables such as age. Or, more likely, it might be because the number of widowed adults in this study is limited and the effects of age and education were not large enough to be identified.

Limitations

There are some noteworthy limitations to this study. First, like many longitudinal widowhood studies in which older adults account for the vast majority of the samples, this study also has missing data caused by the death of the respondents soon after losing their spouse. Due to this naturally occurring sample selection bias, the findings based on those who remained in the study may not be fully representative of individuals experiencing the actual depression changes. Future studies could consider using multiple group analyses by comparing those with complete data and those with missing data to explore the potential impact of missing data. Second, the study is unable to include some contextual variables that may have also affected the depression trajectories. For example, although self-rated physical health was included in the analysis as a proxy variable for the nature of the spouse's death, there was no direct way to ascertain whether the death of the spouse was due to chronic illness or an unexpected event. Besides, whereas the caregiver status was included in the analysis, I was unable to determine the degree of involvement in the caregiving effort based on the information available in the HRS dataset. Third, this study did not examine how personality traits affect depression trajectories

directly or through contextual factors. For example, personality may affect one's perception of social support. Some studies showed that a higher level of perceived support is more closely associated with good physical health and better psychological adjustment (Sarason et al., 1990). Fourth, the depression scale used in this study is an HRS simplified 8-item version of the CES-D, and the response format of the scale has been reduced from the original four categories to two categories. It is possible that this short version CES-D scale could not capture the nuances in depressive symptoms and responses to depression scales among groups of different gender, age groups, and ethnicity. This may explain in some ways why significant group differences in the depression trajectories have not been observed. Finally, because HRS collects data every two years, the depression trajectories of widowed and continuously married adults identified in this study reflect more as long-term trends instead of immediate and timely response curves. It is likely that some individuals experienced a sharp increase in depressive symptoms shortly after the death of their spouse, but the number of symptoms had dropped by the first survey after the loss of a spouse. Hence, the interpretation of the findings of this study should be carried out cautiously with an understanding of these limitations.

Implications

The findings of this study have significant practical implications for health professionals and caregivers. First, the results could help identify widowed adults at risk and most in need of bereavement intervention. Not all adults who lost a spouse need professional intervention. Actually, studies have shown that grief intervention may sometimes interfere with the natural grief process and lead to greater pain in individuals with normal grief (Neimeyer & Currier, 2009; Schut & Stroebe, 2005). Although most widowed adults, such as those in the NDG, can overcome their grief without professional help, widowed adults in the other three less favorable

groups may benefit from additional assistance and intervention. Depression is a known risk factor of premature death and an indicator of poor prognoses of many chronic diseases, such as diabetes, stroke, and heart diseases (Cole & Dendukuri, 2003; Stroebe et al., 2007; Wells & Burnam, 1991). Hence, widowed adults in the CDG may need continuous medical and psychological attention. Besides, timely professional assistance may help widowed adults in the DDG better cope with the loss of the spouse so that their depression level can fall below the alert level much sooner. Finally, recent research has shown that about 9% to 25% of widowed adults may be at risk of prolonged grief disorder (PGD) and hence need professional bereavement intervention (Simon, 2015). In my study, 20.4% of widowed adults were identified in the IDG with a depression trajectory characterized as low depression at baseline, significantly elevated depression after the death of a spouse, and remained at a relatively high level of depression over a long period of time. As suggested in previous studies (Bonanno et al., 2004; Maccallum et al., 2015; Wolff & Wortman, 2005), widowed adults in the IDG might represent a grief group of adults vulnerable to PGD and long-term psychological distress. Hence, it is particularly important to identify and effectively help this high-risk group of widowed adults.

Second, this study's findings also deepen the understanding of at-risk widowed adults in the IDG and could help develop effective psychosocial bereavement interventions for them. Both widowed adults in the IDG and those in the more resilient NDG reported high scores on closeness with the spouse and high positive social support from the spouse. However, the differences between these two groups of widowed adults centered on health function and social support quality. Widowed adults in the IDG reported lower self-rated health and higher rates of ADL impairment than adults in the NDG. Besides, the spouse of widowed adults in the IDG also reported slightly lower self-rated health than did the spouse of adults in the NDG. On variables

related to social support, widowed adults in the IDG had significantly higher NSS from children and friends than adults in the NDG.

In the study of coping with bereavement, the dual process model (DPM) (Stroebe & Schut, 1999, 2010) has received most attention over the past two decades. Unlike the more global stress and coping frameworks, DPM highlights two coping processes: loss-orientated (LO) and restoration-orientated (RO). LO process focuses on the stress resulting from the loss itself, whereas the RO process focuses on coping strategies aiming to deal with ongoing secondary stressors resulting from daily life challenges. According to DPM, bereaved adults will oscillate between these two processes and it is most beneficial for them if they can move back and forth as needed between loss and restoration issues. Recent studies have highlighted the importance of incorporating RO coping strategies into the LO intervention programs so that the bereaved not only can address their grief-related feelings and behaviors, but also can learn new life skills, expand their social networks, and improve self-care activities (Caserta et al., 2014; Utz et al., 2012; Waller et al., 2016). The findings of this study confirm the switch of the intervention focus and show that in addition to improving the quality of emotional support and avoiding relationship strain, support for widowed adults should also focus on improving self-care and health promotion. This focus is especially essential for those who were initially in lack of quality social support and in poor health and hence were most vulnerable to long-term and intense psychological distress.

Summary

Unlike most studies that use cross-sectional data to investigate the level of depression at a specific time point after the death of a spouse, this study used longitudinal data to investigate the changes in the number of depressive symptoms over a period of eight years before and after the

death of a spouse. On the basis of previous studies (Bonanno et al., 2004; Maccallum et al., 2015; Wolff & Wortman, 2005), the results of this study further demonstrate that there is heterogeneity in the mental health outcomes of the death of a spouse and four distinct depression trajectories in the transition to widowhood were identified.

The study also provides a better understanding of the effects of demographic variables on the depression trajectories and compares widowed adults with continuously married adults. Except for education level, all the other demographic variables could not differentiate widowed adults with different depression trajectories. However, the results do show significant group differences between widowed and continuously married individuals. Compared to remaining married adults, widowed adults were more likely to be older, female, non-White, having fewer years of education, having a lower household income, and having a longer marriage history at baseline.

In addition to examining the effects of demographic variables on the depression trajectories, this study also investigated the possible impact of pre-loss contextual factors, such as the relationship with the spouse, health status and functional limitations, caregiver status, positive and negative social support from various sources, and the frequency of religious attendance. The results highlight the critical impact of health status, functional limitations, and negative social support on one's depression trajectories in widowhood. Taken together, these findings have deepened the understanding of distinct depression trajectories and their affecting factors in the transition to widowhood. Future research should continuously take a more comprehensive approach and a long-term perspective to studying the heterogeneity in the responses and consequences of the death of a spouse.

REFERENCES

Adelman, R. D., Tmanova, L. L., Delgado, D., Dion, S., & Lachs, M. S. (2014). Caregiver burden: a clinical review. *Journal of the American Medical Association*, *311*(10), 1052-1060. https://doi.org/10.1001/jama.2014.304

Adler, N. E., Boyce, T., Chesney, M. A., Cohen, S., Folkman, S., Kahn, R. L., & Syme, S. L. (1994). Socioeconomic status and health: The challenge of the gradient. *American Psychologist*, *49*(1), 15-24. https://doi.org/10.1037/0003-066X.49.1.15

Adler, N. E., & Matthews, K. A. (1994). Health psychology: Why do some people get sick and some stay well? *Annual Review of Psychology*, *45*(1), 229-259. https://doi.org/10.1146/annurev.ps.45.020194.001305

Adler, N. E., & Ostrove, J. (1998). Socioeconomic status and health: What we know and what we don't. *Annals of the New York Academy of Sciences*, *896*(1), 3-15. https://doi.org/10.1111/j.1749-6632.1999.tb08101.x

Alpass, F. M., & Neville, S. (2003). Loneliness, health and depression in older males. *Aging & Mental Health*, *7*(3), 212-216. https://doi.org/10.1080/1360786031000101193

Baltes, M. M., & Baltes, P. B. (1990). Psychological perspectives on successful aging: The model of selective optimization with compensation. In M. M. Baltes & P. B. Baltes (Eds.), *Successful aging: Perspectives from the behavioral sciences* (pp. 1-34). Cambridge University Press.

Baranzini, D. (2018, November). *The "Bar Procedure": Single data-file compressing SPSS multiply imputed files*. https://www.researchgate.net/publication/328887514_SPSS_Single_dataframe_aggregating_SPSS_Multiply_Imputed_split_files

Bengtson, V. L., & Allen, K. R. (1993). The life course perspective applied to families over time. In P. G. Boss, W. J. Doherty, R. LaRossa, W. R. Schumm, & S. K. Steinmet (Eds.), *Sourcebook of family theories and methods* (pp. 469-498). Plenum Press.

Bennett, K. M., Smith, P. T., & Hughes, G. M. (2005). Coping, depressive feelings and gender differences in late life widowhood. *Aging & Mental Health, 9*(4), 348-353. https://doi.org/10.1080/13607860500089609

Berkman, L. F. (2009). Social epidemiology: Social determinants of health in the United States: Are we losing ground? *Annual Review of Public Health, 30*(1), 27-41. https://doi.org/10.1146/annurev.publhealth.031308.100310

Berkman, L. F., Berkman, C. S., Kasl, S., Freeman Jr, D. H., Leo, L., Ostfeld, A. M., Cornoni-Huntley, J., & Brody, J. A. (1986). Depressive symptoms in relation to physical health and functioning in the elderly. *American Journal of Epidemiology, 124*(3), 372-372. https://doi.org/10.1093/oxfordjournals.aje.a114408

Blazer, D. G. (2003). Depression in late life: Review and commentary. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences, 58*(3), 249-265. https://doi.org/10.1093/gerona/58.3.M249

Bonanno, G. A., Notarius, C., Gunzerath, L., Keltner, D., & Horowitz, M. (1998). Interpersonal ambivalence, perceived relationship adjustment, and conjugal loss. *Journal of Consulting and Clinical Psychology, 66*(6), 1012-1022. https://doi.org/10.1037/0022-006X.66.6.1012

Bonanno, G. A., Wortman, C. B., Lehman, D. R., Tweed, R. G., Haring, M., Sonnega, J., Carr, D., & Nesse, R. M. (2002). Resilience to loss and chronic grief: A prospective study from preloss to 18-months postloss. *Journal of Personality and Social Psychology, 83*(5), 1150-1164. https://doi.org/10.1037/0022-3514.83.5.1150

Bonanno, G. A., Wortman, C. B., & Nesse, R. M. (2004). Prospective patterns of resilience and maladjustment during widowhood. *Psychology and Aging, 19*(2), 260-271. https://doi.org/10.1037/0882-7974.19.2.260

Bowling, A. (1987). Mortality after bereavement: A review of the literature on survival periods and factors affecting survival. *Social Science and Medicine, 24*(2), 117-124. https://doi.org/10.1016/0277-9536(87)90244-9

Broadhead, W. E., Blazer, D. G., George, L. K., & Tse, C. K. (1990). Depression, disability days, and days lost from work in a prospective epidemiologic survey. *Journal of the American Medical Association, 264*(19), 2524-2528. https://doi.org/10.1001/jama.1990.03450190056028

Brown, S. L., Nesse, R. M., House, J. S., & Utz, R. L. (2004). Religion and emotional compensation: Results from a prospective study of widowhood. *Personality and Social Psychology Bulletin, 30*(9), 1165-1174. https://doi.org/10.1177/0146167204263752

Carr, D. (2004). Gender, preloss marital dependence, and older adults' adjustment to widowhood. *Journal of Marriage and Family, 66*(1), 220-235. https://doi.org/10.1111/j.0022-2445.2004.00016.x

Carr, D., & Boerner, K. (2009). Do spousal discrepancies in marital quality assessments affect psychological adjustment to widowhood? *Journal of Marriage and Family, 71*(3), 495-509. https://doi.org/10.1111/j.1741-3737.2009.00615.x

Carr, D., House, J. S., Kessler, R. C., Nesse, R. M., Sonnega, J., & Wortman, C. (2000). Marital quality and psychological adjustment to widowhood among older adults: A longitudinal analysis. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 55*(4), S197-S207. https://doi.org/10.1093/geronb/55.4.S197

Carr, D., & Utz, R. (2001). Late-life widowhood in the United States: New directions in research and theory. *Ageing International, 27*(1), 65-88. https://doi.org/10.1007/s12126-001-1016-3

Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American Psychologist, 54*(3), 165-181. https://doi.org/10.1037//0003-066x.54.3.165

Caserta, M., Utz, R., Lund, D., Swenson, K. L., & de Vries, B. (2014). Coping processes among bereaved spouses. *Death Studies, 38*(3), 145-155. https://doi.org/10.1080/07481187.2012.738767

Chen, H., Cohen, P., & Chen, S. (2010). How big is a big odds ratio? Interpreting the magnitudes of odds ratios in epidemiological studies. *Communications in Statistics: Simulation and Computation, 39*(4), 860-864. https://doi.org/10.1080/03610911003650383

Chou, K.-L., & Chi, I. (2000). Stressful events and depressive symptoms among old women and men: A longitudinal study. *The International Journal of Aging and Human Development, 51*(4), 275-293. https://doi.org/10.2190/VNJC-TQ4W-6T3R-6V9K

Clyburn, L. D., Stones, M. J., Hadjistavropoulos, T., & Tuokko, H. (2000). Predicting caregiver burden and depression in Alzheimer's disease. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 55*(1), S2-S13. https://doi.org/10.1093/geronb/55.1.S2

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Routledge.

Cohen, S. (2004). Social relationships and health. *American Psychologist, 59*(8), 676-684. https://doi.org/10.1037/0003-066X.59.8.676

Cohen, S., Janicki-Deverts, D., Chen, E., & Matthews, K. A. (2010). Childhood socioeconomic status and adult health. In N. E. Adler & J. Stewart (Eds.), *Biology of disadvantage: Socioeconomic status and health* (pp. 37-55). https://doi.org/10.1111/j.1749-6632.2009.05334.x

Cohen, S., & Syme, S. L. (1985). *Social support and health*. Academic Press.

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological bulletin, 98*(2), 310. https://doi.org/10.1037/0033-2909.98.2.310

Cole, M. G., & Dendukuri, N. (2003). Risk factors for depression among elderly community subjects: A systematic review and meta-analysis. *American Journal of Psychiatry, 160*(6), 1147-1156. https://doi.org/10.1176/appi.ajp.160.6.1147

Cutrona, C. E. (1996). *Social support in couples: Marriage as a resource in times of stress*. Sage Publications.

Cutrona, C. E., & Russell, D. W. (1990). Type of social support and specific stress: Toward a theory of optimal matching. In B. R. Sarason, I. G. Sarason, & G. R. Pierce (Eds.), *Wiley series on personality processes. Social support: An interactional view* (pp. 319-366). John Wiley & Sons.

de Vries, B., Utz, R., Caserta, M., & Lund, D. (2014). Friend and family contact and support in early widowhood. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 69*(1), 75-84. https://doi.org/10.1093/geronb/gbt078

Dohrenwend, B., Krasnoff, L., Askenasy, A., & Dohrenwend, B. (1978). Exemplification of a method for scaling life events: The Peri Life Events Scale. *Journal of Health and Social Behavior, 19*(2), 205-229. https://doi.org/10.2307/2136536

Elwert, F., & Christakis, N. A. (2006). Widowhood and race. *American Sociological Review, 71*(1), 16-41. https://doi.org/10.1177/000312240607100102

Ferguson, S. L., G. Moore, E. W., & Hull, D. M. (2020). Finding latent groups in observed data: A primer on latent profile analysis in Mplus for applied researchers. *International Journal of Behavioral Development, 44*(5), 458-468. https://doi.org/10.1093/geront/gny115

Fernandez, M. E., Mutran, E. J., Reitzes, D. C., & Sudha, S. (1998). Ethnicity, gender, and depressive symptoms in older workers. *The Gerontologist, 38*(1), 71-79. https://doi.org/10.1093/geront/38.1.71

Fisher, E. B., Coufal, M. M., Parada, H., Robinette, J. B., Tang, P. Y., Urlaub, D. M., Castillo, C., Guzman-Corrales, L. M., Hino, S., Hunter, J., Katz, A. W., Symes, Y. R., Worley, H. P., & Xu, C. (2014). Peer support in health care and prevention: Cultural, organizational, and dissemination issues. *Annual Review of Public Health, 35*(1), 363-383. https://doi.org/doi:10.1146/annurev-publhealth-032013-182450

Fiske, A., Wetherell, J. L., & Gatz, M. (2009). Depression in older adults. *Annual Review of Clinical Psychology, 5*(1), 363-389. https://doi.org/10.1146/annurev.clinpsy.032408.153621

Fonda, S., & Herzog, A. R. (2004). *Documentation of physical functioning measured in the Heath and Retirement Study and the Asset and Health Dynamics among the Oldest Old Study*. http://hrsonline.isr.umich.edu/sitedocs/userg/dr-008.pdf

Futterman, A., Gallagher, D., Thompson, L. W., Lovett, S., & Gilewski, M. (1990). Retrospective assessment of marital adjustment and depression during the first 2 years of spousal bereavement. *Psychology and Aging, 5*(2), 277-283. https://doi.org/10.1037/0882-7974.5.2.277

Galatzer-Levy, I. R., & Bonanno, G. A. (2012). Beyond normality in the study of bereavement: Heterogeneity in depression outcomes following loss in older adults. *Social Science & Medicine, 74*(12), 1987-1994. https://doi.org/10.1016/j.socscimed.2012.02.022

George, L. K. (1993). Sociological perspectives on life transitions. *Annual Review of Sociology, 19*(1), 353-373. https://doi.org/10.1146/annurev.so.19.080193.002033

George, L. K. (1999). Life-course perspectives on mental health. In C. S. Aneshensel & J. C. Phelan (Eds.), *Handbook of the sociology on mental health* (pp. 565-583). Springer.

George, L. K. (2013). Life-course perspectives on mental health. In C. S. Aneshensel, J. C. Phelan, & A. Bierman (Eds.), *Handbook of the sociology of mental health* (2 ed., pp. 585-602). Springer.

George, L. K., & Lynch, S. M. (2003). Race differences in depressive symptoms: A dynamic perspective on stress exposure and vulnerability. *Journal of Health and Social Behavior, 44*(3), 353-353. https://doi.org/10.2307/1519784

Ha, J.-H. (2008). Changes in support from confidants, children, and friends following widowhood. *Journal of Marriage and Family, 70*(2), 306-318. https://doi.org/10.1111/j.1741-3737.2008.00483.x

Harlow, S. D., Goldberg, E. L., & Comstock, G. W. (1991). A longitudinal study of the prevalence of depressive symptomatology in elderly widowed and married women. *Archives of General Psychiatry, 48*(12), 1065-1068. https://doi.org/10.1001/archpsyc.1991.01810360029004

Headey, B. (2010). The set point theory of well-being has serious flaws: on the eve of a scientific revolution? *Social Indicators Research, 97*(1), 7-21. https://doi.org/10.1007/s11205-009-9559-x

Holmes, T. H., & Rahe, R. H. (1967). The social readjustment rating scale. *Journal of Psychosomatic Research, 11*(2), 213-218. https://doi.org/10.1016/0022-3999(67)90010-4

HRS Psychosocial Working Group. (2013). *Psychosocial and lifestyle questionnaire 2006 - 2010: Documentation report core section LB.* http://hrsonline.isr.umich.edu/sitedocs/userg/HRS2006-2010SAQdoc.pdf

HRS Staff. (2017). *Sample sizes and response rates.* https://hrs.isr.umich.edu/sites/default/files/biblio/ResponseRates_2017.pdf

Hultsch, D. F., & Plemons, J. K. (1979). Life events and life-span development. In P. B. Baltes & O. G. J. Brim (Eds.), *Life-span development and behavior* (pp. 1-37). Academic Press.

Hurd, M. D., Meijer, E., Moldoff, M., & Rohwedder, S. (2016). *Improved wealth measures in the Health and Retirement Study: Asset reconciliation and cross-wave imputation* [Working Paper]. https://www.rand.org/pubs/working_papers/WR1150.html

Idler, E. L., Musick, M. A., Ellison, C. G., George, L. K., Krause, N., Ory, M. G., Pargament, K. I., Powell, L. H., Underwood, L. G., & Williams, D. R. (2003). Measuring multiple dimensions of religion and spirituality for health research: Conceptual background and findings from the 1998 General Social Survey. *Research on Aging, 25*(4), 327-365. https://doi.org/10.1177/0164027503025004001

Inaba, A., Thoits, P. A., Ueno, K., Gove, W. R., Evenson, R. J., & Sloan, M. (2005). Depression in the United States and Japan: Gender, marital status, and SES patterns. *Social Science & Medicine, 61*(11), 2280-2292. https://doi.org/10.1016/j.socscimed.2005.07.014

Jackson, P. B. (1997). Role occupancy and minority mental health. *Journal of Health and Social Behavior*, *38*(3), 237-255. https://doi.org/10.2307/2955369

Jacobs, S., Hansen, F., Berkman, L. F., Kasl, S., & Ostfeld, A. (1989). Depressions of bereavement. *Comprehensive Psychiatry*, *30*(3), 218-224. https://doi.org/10.1016/0010-440X(89)90041-2

Jadhav, A., & Weir, D. (2018). Widowhood and depression in a cross-national perspective: Evidence from the United States, Europe, Korea, and China. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 73*(8), e143-e153. https://doi.org/10.1093/geronb/gbx021

Karim, J., Weisz, R., Bibi, Z., & ur Rehman, S. (2015). Validation of the eight-item center for epidemiologic studies depression scale (CES-D) among older adults. *Current Psychology*, *34*(4), 681-692. https://doi.org/10.1007/s12144-014-9281-y

Kaufman, J. E., Lee, Y., Vaughon, W., Unuigbe, A., & Gallo, W. T. (2018). Depression associated with transitions into and out of spousal caregiving. *The International Journal of Aging and Human Development, Advance online publication*. https://doi.org/10.1177/0091415018754310

Kaup, A. R., Byers, A. L., Falvey, C., Simonsick, E. M., Satterfield, S., Ayonayon, H. N., Smagula, S. F., Rubin, S. M., & Yaffe, K. (2016). Trajectories of depressive symptoms in older adults and risk of dementia. *JAMA Psychiatry, 73*(5), 525-531. https://doi.org/10.1001/jamapsychiatry.2016.0004

Keene, J. R., & Prokos, A. H. (2008). Widowhood and the end of spousal care-giving: relief or wear and tear? *Ageing & Society, 28*(4), 551-570. https://doi.org/10.1017/S0144686X07006654

Kessler, R. C. (1979). Stress, social status, and psychological distress. *Journal of Health and Social Behavior, 20*(3), 259-272. https://doi.org/10.2307/2136450

Kessler, R. C., Mickelson, K. D., & Williams, D. R. (1999). The prevalence, distribution, and mental health correlates of perceived discrimination in the United States. *Journal of Health and Social Behavior, 40*(3), 208-230. https://doi.org/10.2307/2676349

Kessler, R. C., & Neighbors, H. W. (1986). A new perspective on the relationships among race, social class, and psychological distress. *Journal of Health and Social Behavior, 27*(2), 107-115. https://doi.org/10.2307/2136310

Kessler, R. C., Price, R. H., & Wortman, C. B. (1985). Social factors in psychopathology: Stress, social support, and coping processes. *Annual Review of Psychology, 36*(1), 531-572. https://doi.org/10.1146/annurev.ps.36.020185.002531

King, B. M., Carr, D. C., & Taylor, M. G. (2018). Depressive symptoms and the buffering effect of resilience on widowhood by gender. *The Gerontologist, 59*(6), 1122-1130. https://doi.org/10.1093/geront/gny115

Krause, N. (2002). Church-based social support and health in old age exploring variations by race. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 57*(6), S332-S347. https://doi.org/10.1093/geronb/57.6.S332

Kuchibhatla, M. N., Fillenbaum, G. G., Hybels, C. F., & Blazer, D. G. (2012). Trajectory classes of depressive symptoms in a community sample of older adults. *Acta Psychiatrica Scandinavica, 125*(6), 492-501. https://doi.org/10.1111/j.1600-0447.2011.01801.x

Lee, G. R., & DeMaris, A. (2007). Widowhood, gender, and depression: A longitudinal analysis. *Research on Aging, 29*(1), 56-72. https://doi.org/10.1177/0164027506294098

Lee, G. R., DeMaris, A., Bavin, S., & Sullivan, R. (2001). Gender differences in the depressive effect of widowhood in later life. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 56*(1), S56-S61. https://doi.org/10.1093/geronb/56.1.S56

Lee, G. R., Willetts, M. C., & Seccombe, K. (1998). Widowhood and depression: Gender differences. *Research on Aging, 20*(5), 611-630. https://doi.org/10.1177/0164027598205004

Liechtenstein, P., Gatz, M., Pedersen, N. L., Berg, S., & McClearn, G. E. (1996). A co-twin—control study of response to widowhood. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 51*(5), P279-P289. https://doi.org/10.1093/geronb/51B.5.P279

Lorant, V., Deliège, D., Eaton, W., Robert, A., Philippot, P., & Ansseau, M. (2003). Socioeconomic inequalities in depression: A meta-analysis. *American Journal of Epidemiology, 157*(2), 98-112. https://doi.org/10.1093/aje/kwf182

Lotterman, J. H., Bonanno, G. A., & Galatzer-Levy, I. (2014). The heterogeneity of long-term grief reactions. *Journal of Affective Disorders, 167*, 12-19. https://doi.org/10.1016/j.jad.2014.05.048

Luhmann, M., & Intelisano, S. (2018). Hedonic adaptation and the set point for subjective well-being. In E. Diener, S. Oishi, & L. Tay (Eds.), *Handbook of well-being*. DEF Publishers.

Lund, D. A., Caserta, M. S., & Dimond, M. F. (1993). The course of spousal bereavement in later life. In M. S. Stroebe & W. Stroebe (Eds.), *Handbook of bereavement: Theory, research, and intervention* (pp. 240-254). Cambridge University Press.

Lykken, D., & Tellegen, A. (1996). Happiness is a stochastic phenomenon. *Psychological Science, 7*(3), 186-189. https://doi.org/10.1111/j.1467-9280.1996.tb00355.x

Maccallum, F., Galatzer-Levy, I. R., & Bonanno, G. A. (2015). Trajectories of depression following spousal and child bereavement: A comparison of the heterogeneity in outcomes. *Journal of Psychiatric Research, 69*, 72-79. https://doi.org/10.1016/j.jpsychires.2015.07.017

Manor, O., & Eisenbach, Z. (2003). Mortality after spousal loss: Are there socio-demographic differences? *Social Science & Medicine, 56*(2), 405-413. https://doi.org/10.1016/S0277-9536(02)00046-1

Manzoli, L., Villari, P., Pirone, G. M., & Boccia, A. (2007). Marital status and mortality in the elderly: A systematic review and meta-analysis. *Social Science & Medicine, 64*(1), 77-94. https://doi.org/10.1016/j.socscimed.2006.08.031

Martikainen, P., & Valkonen, T. (1996). Mortality after death of spouse in relation to duration of bereavement in Finland. *Journal of Epidemiology & Community Health, 50*(3), 264-268. https://doi.org/10.1136/jech.50.3.264

Matthews, K. A., Gallo, L. C., & Taylor, S. E. (2010). Are psychosocial factors mediators of socioeconomic status and health connections? *Annals of the New York Academy of Sciences, 1186*(1), 146-173. https://doi.org/10.1111/j.1749-6632.2009.05332.x

Mendes de Leon, C. M., Kasl, S., & Jacobs, S. (1994). A prospective study of widowhood and changes in symptoms of depression in a community sample of the elderly. *Psychological Medicine, 24*(3), 613-624. https://doi.org/10.1017/S0033291700027768

Michael, S. T., Crowther, M. R., Schmid, B., & Allen, R. S. (2003). Widowhood and spirituality: Coping responses to bereavement. *Journal of Women & Aging, 15*(2-3), 145-165. https://doi.org/10.1300/J074v15n02_09

Mojtabai, R., & Olfson, M. (2004). Major depression in community-dwelling middle-aged and older adults: Prevalence and 2-and 4-year follow-up symptoms. *Psychological Medicine, 34*(4), 623-634. https://doi.org/10.1017/S0033291703001764

Moss, M. S., Moss, S. Z., & Hansson, R. O. (2001). Bereavement and old age. In M. S. Stroebe & R. O. Hansson (Eds.), *Handbook of bereavement research: Consequences, coping and care* (pp. 241–260). American Psychological Association.

Moussavi, S., Chatterji, S., Verdes, E., Tandon, A., Patel, V., & Ustun, B. (2007). Depression, chronic diseases, and decrements in health: Results from the World Health Surveys. *The Lancet, 370*(9590), 851-858. https://doi.org/10.1016/S0140-6736(07)61415-9

Mulsant, B. H., Ganguli, M., & Seaberg, E. C. (1997). The relationship between self-rated health and depressive symptoms in an epidemiological sample of community-dwelling older adults. *Journal of the American Geriatrics Society, 45*(8), 954-958. https://doi.org/10.1111/j.1532-5415.1997.tb02966.x

Musselman, D. L., Evans, D. L., & Nemeroff, C. B. (1998). The relationship of depression to cardiovascular disease: Epidemiology, biology, and treatment. *Archives of General Psychiatry, 55*(7), 580-592. https://doi.org/10.1001/archpsyc.55.7.580

Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus user's guide*. (8 ed.). Muthén & Muthén.

Myers, H. F., Lesser, I., Rodriguez, N., Mira, C. B., Hwang, W., Camp, C., Anderson, D., Erickson, L., & Wohl, M. (2002). Ethnic differences in clinical presentation of depression in adult women. *Cultural Diversity and Ethnic Minority Psychology, 8*(2), 138-156. https://doi.org/10.1037/1099-9809.8.2.138

Neimeyer, R. A., & Currier, J. M. (2009). Grief therapy: Evidence of efficacy and emerging directions. *Current Directions in Psychological Science, 18*(6), 352-356. https://doi.org/10.1111/j.1467-8721.2009.01666.x

Neugarten, B. L. (1968). Adult personality: Toward a psychology of the life cycle. In B. L. Neugarten (Ed.), *Middle age and aging* (pp. 137-147). University of Chicago Press.

Nolen-Hoeksema, S., & Ahrens, C. (2002). Age differences and similarities in the correlates of depressive symptoms. *Psychology and Aging, 17*(1), 116-124. https://doi.org/10.1037/0882-7974.17.1.116

Oquendo, M. A., Ellis, S. P., Greenwald, S., Malone, K. M., Weissman, M. M., & Mann, J. J. (2001). Ethnic and sex differences in suicide rates relative to major depression in the United States. *American Journal of Psychiatry, 158*(10), 1652-1658. https://doi.org/10.1176/appi.ajp.158.10.1652

Park, C. L., & Folkman, S. (1997). Meaning in the context of stress and coping. *Review of General Psychology, 1*(2), 115-144. https://doi.org/10.1037/1089-2680.1.2.115

Pearlin, L. I., Aneshensel, C. S., & LeBlanc, A. J. (1997). The forms and mechanisms of stress proliferation: The case of AIDS caregivers. *Journal of Health and Social Behavior, 38*(3), 223-236. https://doi.org/10.2307/2955368

Pearlin, L. I., Schieman, S., Fazio, E. M., & Meersman, S. C. (2005). Stress, health, and the life course: Some conceptual perspectives. *Journal of Health and Social Behavior, 46*(2), 205-219. https://doi.org/10.1177/002214650504600206

Perrig-Chiello, P., Spahni, S., Höpflinger, F., & Carr, D. (2016). Cohort and gender differences in psychosocial adjustment to later-life widowhood. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 71*(4), 765-774. https://doi.org/10.1093/geronb/gbv004

Pienta, A. M., & Franks, M. M. (2005). A closer look at health and widowhood: Do health behaviors change after the loss of a spouse. In D. S. Carr, R. M. Nesse, & C. B. Wortman (Eds.), *Spousal bereavement in late life* (pp. 117-142). Springer Publishing Company.

Pinquart, M., & Sörensen, S. (2003). Differences between caregivers and noncaregivers in psychological Health and Physical Health: A meta-analysis. *Psychology and Aging, 18*(2), 250-267. https://doi.org/10.1037/0882-7974.18.2.250

Prokos, A. H., & Keene, J. R. (2005). The long-term effects of spousal care giving on survivors' well-being in widowhood? *Social Science Quarterly, 86*(3), 664-682. https://doi.org/10.1111/j.0038-4941.2005.00323.x

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385-401. https://doi.org/10.1177/014662167700100306

Rando, T. A. (1993). *Treatment of complicated mourning*. Research Press.

Riolo, S. A., Nguyen, T. A., Greden, J. F., & King, C. A. (2005). Prevalence of depression by race/ethnicity: Findings from the National Health and Nutrition Examination Survey III. *American Journal of Public Health, 95*(6), 998-1000. https://doi.org/10.2105/AJPH.2004.047225

Roff, L. L., Durkin, D., Sun, F., & Klemmack, D. L. (2007). Widowhood, religiousness, and self-assessed well-being among older adults. *Journal of Religion, Spirituality & Aging, 19*(4), 43-59. https://doi.org/10.1300/J496v19n04_04

Rook, K. S. (1984). The negative side of social interaction. *Journal of Personality and Social Psychology, 46*(5), 1097-1108. https://doi.org/10.1037/0022-3514.46.5.1097

Rook, K. S. (1997). Positive and negative social exchanges: Weighing their effects in later life. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 52*(4), S167-S169. https://doi.org/10.1093/geronb/52B.4.S167

Sarason, I. G., Sarason, B. R., & Pierce, G. R. (1990). Social support, personality, and performance. *Journal of Applied Sport Psychology, 2*(2), 117-127. https://doi.org/10.1080/10413209008406425

Sasson, I., & Umberson, D. J. (2014). Widowhood and depression: New light on gender differences, selection, and psychological adjustment. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 69*(1), 135-145. https://doi.org/10.1093/geronb/gbt058

Schaan, B. (2013). Widowhood and depression among older Europeans—The role of gender, caregiving, marital quality, and regional context. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 68*(3), 431-442. https://doi.org/10.1093/geronb/gbt015

Schulz, R., McGinnis, K. A., Zhang, S., Martire, L. M., Hebert, R. S., Beach, S. R., Zdaniuk, B., Czaja, S. J., & Belle, S. H. (2008). Dementia patient suffering and caregiver depression. *Alzheimer Disease and Associated Disorders, 22*(2), 170-176. https://doi.org/10.1097/WAD.0b013e31816653cc

Schut, H., & Stroebe, M. S. (2005). Interventions to enhance adaptation to bereavement. *Journal of Palliative Medicine, 8*(supplement 1), s-140-s-147. https://doi.org/10.1089/jpm.2005.8.s-140

Sherkat, D. E., & Reed, M. D. (1992). The effects of religion and social support on self-esteem and depression among the suddenly bereaved. *Social Indicators Research, 26*(3), 259-275. https://doi.org/10.1007/BF00286562

Shor, E., Roelfs, D. J., Curreli, M., Clemow, L., Burg, M. M., & Schwartz, J. E. (2012). Widowhood and mortality: A meta-analysis and meta-regression. *Demography, 49*(2), 575-606. https://doi.org/10.1007/s13524-012-0096-x

Silverstein, M., & Bengtson, V. L. (1994). Does intergenerational social support influence the psychological well-being of older parents? The contingencies of declining health and widowhood. *Social Science & Medicine, 38*(7), 943-957. https://doi.org/10.1016/0277-9536(94)90427-8

Simon, N. M. (2015). Increasing support for the treatment of complicated grief in adults of all ages. *Journal of the American Medical Association, 313*(21), 2172-2173. https://doi.org/10.1001/jama.2015.105

Steffick, D. E. (2000). *Documentation of affective functioning measures in the Health and Retirement Study*. https://hrs.isr.umich.edu/sites/default/files/biblio/dr-005.pdf

Stroebe, M., & Schut, H. (1999). The dual process model of coping with bereavement: Rationale and description. *Death Studies, 23*(3), 197-224. https://doi.org/10.1080/074811899201046

Stroebe, M., & Schut, H. (2010). The dual process model of coping with bereavement: A decade on. *OMEGA-Journal of Death and Dying, 61*(4), 273-289. https://doi.org/10.2190/OM.61.4.b

Stroebe, M. S., Schut, H., & Stroebe, W. (2007). Health outcomes of bereavement. *The Lancet, 370*(9603), 1960-1973. https://doi.org/10.1016/S0140-6736(07)61816-9

Stroebe, M. S., Stroebe, W., & Schut, H. (2001). Gender differences in adjustment to bereavement. *Review of General Psychology, 5*(1), 62-83. https://doi.org/10.1037/1089-2680.5.1.62

Stroebe, W., & Stroebe, M. S. (1987). *Bereavement and health: The psychological and physical consequences of partner loss*. Cambridge University Press.

Sullivan, A. R., & Fenelon, A. (2014). Patterns of widowhood mortality. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 69*(1), 53-62. https://doi.org/10.1093/geronb/gbt079

Thompson, L. W., Gallagher, D., Cover, H., Gilewski, M., & Peterson, J. (1989). Effects of bereavement on symptoms of psychopathology in older men and women. In D. A. Lund (Ed.), *Older bereaved spouses: Research with practical applications* (pp. 17-24). Hemisphere.

Torges, C. M., Stewart, A. J., & Nolen-Hoeksema, S. (2008). Regret resolution, aging, and adapting to loss. *Psychology and Aging, 23*(1), 169-180. https://doi.org/10.1037/0882-7974.23.1.169

Turner, R., & Avison, W. (2003). Status variations in stress exposure: implications for the interpretation of research on race, socioeconomic status, and gender. *Journal of Health and Social Behavior, 44*(4), 488-505. https://doi.org/10.2307/1519795

U.S. Census Bureau. (2014). *65+ in the United States: 2010*. U.S. Government Printing Office.

Ulbrich, P., Warheit, G., & Zimmerman, R. (1989). Race, socioeconomic status, and psychological distress: An examination of differential vulnerability. *Journal of Health and Social Behavior, 30*(1), 131-146. https://doi.org/10.2307/2136918

Umberson, D., Wortman, C. B., & Kessler, R. C. (1992). Widowhood and depression: Explaining long-term gender differences in vulnerability. *Journal of Health and Social Behavior, 33*(1), 10-24. https://doi.org/10.2307/2136854

Utz, R. L., Caserta, M., & Lund, D. (2012). Grief, depressive symptoms, and physical health among recently bereaved spouses. *The Gerontologist, 52*(4), 460-471. https://doi.org/10.1093/geront/gnr110

Vitaliano, P. P., Zhang, J., & Scanlan, J. M. (2003). Is caregiving hazardous to one's physical health? A meta-analysis. *Psychological Bulletin, 129*(6), 946-972. https://doi.org/10.1037/0033-2909.129.6.946

Waller, A., Turon, H., Mansfield, E., Clark, K., Hobden, B., & Sanson-Fisher, R. (2016). Assisting the bereaved: A systematic review of the evidence for grief counselling. *Palliative Medicine, 30*(2), 132-148. https://doi.org/10.1177/0269216315588728

Walsh, K., King, M., Jones, L., Tookman, A., & Blizard, R. (2002). Spiritual beliefs may affect outcome of bereavement: Prospective study. *British Medical Journal, 324*(7353), 1551-1555. https://doi.org/10.1136/bmj.324.7353.1551

Wang, J., & Wang, X. (2012). *Structural equation modeling: Applications using Mplus*. John Wiley & Sons.

Wells, K. B., & Burnam, M. A. (1991). Caring for depression in America: lessons learned from early findings of the medical outcomes study. *Psychiatric Medicine, 9*(4), 503-519. https://doi.org/10.1016/0163-8343(91)90056-3

Williams, K. (2003). Has the future of marriage arrived? A contemporary examination of gender, marriage, and psychological well-being. *Journal of Health and Social Behavior, 44*(4), 470-487. https://doi.org/10.2307/1519794

Williams, K., & Umberson, D. (2004). Marital status, marital transitions, and health: A gendered life course perspective. *Journal of Health and Social Behavior, 45*(1), 81-98. https://doi.org/10.1177/002214650404500106

Williamson, G. M., & Shaffer, D. R. (2002). The activity restriction model of depressed affect: Antecedents and consequences of restricted normal activities. In G. M. Williamson, D. R. Shaffer, & P. A. Parmelee (Eds.), *Physical illness and depression in older adults: A handbook of theory, research, and practice* (pp. 173-200). Springer.

Wolff, K., & Wortman, C. B. (2005). Psychological consequences of spousal loss among older adults: Understanding the diversity of responses. In D. S. Carr, R. M. Nesse, & C. B. Wortman (Eds.), *Spousal bereavement in late life* (pp. 81-115). Springer Publishing Company.

Wortman, C. B., & Silver, R. C. (1990). Successful mastery of bereavement and widowhood: A life-course perspective. In P. B. Baltes & M. M. Baltes (Eds.), *Successful aging: Perspectives from the behavioral sciences* (pp. 225-264). Cambridge University Press.

Wortman, C. B., Silver, R. C., & Kessler, R. C. (1993). The meaning of loss and adjustment to bereavement. In M. S. Stroebe, W. Stroebe, & R. O. Hansson (Eds.), *Bereavement: A sourcebook of research and intervention* (pp. 349-366). Cambridge University Press. https://doi.org/10.1017/CBO9780511664076.024

Zisook, S., Shuchter, S. R., & Mulvihill, M. (1990). Alcohol, cigarette, and medication use during the first year of widowhood. *Psychiatric Annals*, *20*(6), 318-326. https://doi.org/10.3928/0048-5713-19900601-09

Zisook, S., Shuchter, S. R., Sledge, P., & Mulvihill, M. (1993). Aging and bereavement. *Journal of Geriatric Psychiatry and Neurology*, *6*(3), 137-143. https://doi.org/10.1177/089198879300600302

Zivin, K., Llewellyn, D. J., Lang, I. A., Vijan, S., Kabeto, M. U., Miller, E. M., & Langa, K. M. (2010). Depression among older adults in the United States and England. *The American Journal of Geriatric Psychiatry, 18*(11), 1036-1044. https://doi.org/10.1097/JGP.0b013e3181dba6d2

APPENDIX
IRB APPROVAL

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
2420 Lincoln Way, Suite 202
Ames, Iowa 50014
515 294-4566

Date: 07/27/2020

To: Feng Zhao Peter Martin

From: Office for Responsible Research

Title: **Depression trajectories of older adults in the transition to widowhood**

IRB ID: **20-320**

Submission Type: Initial Submission **Determination Date:** 07/27/2020

The project referenced above has been reviewed and the following determination has been made. The project:

Is research that does not involve human subjects according to federal regulations.

Accordingly, this project does not need IRB approval and you may proceed at any time. We do, however, urge you to protect the rights of your participants in the same ways you would if IRB approval were required. For example, best practices include informing participants that involvement in the project is voluntary and maintaining confidentiality as appropriate. Additionally, approval from other entities may be needed depending on your project. This IRB determination in no way implies or guarantees that permission from these other entities will be granted.

If you modify the project, we recommend communicating with the IRB staff to ensure that the modifications do not change this determination such that IRB approval is required.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.